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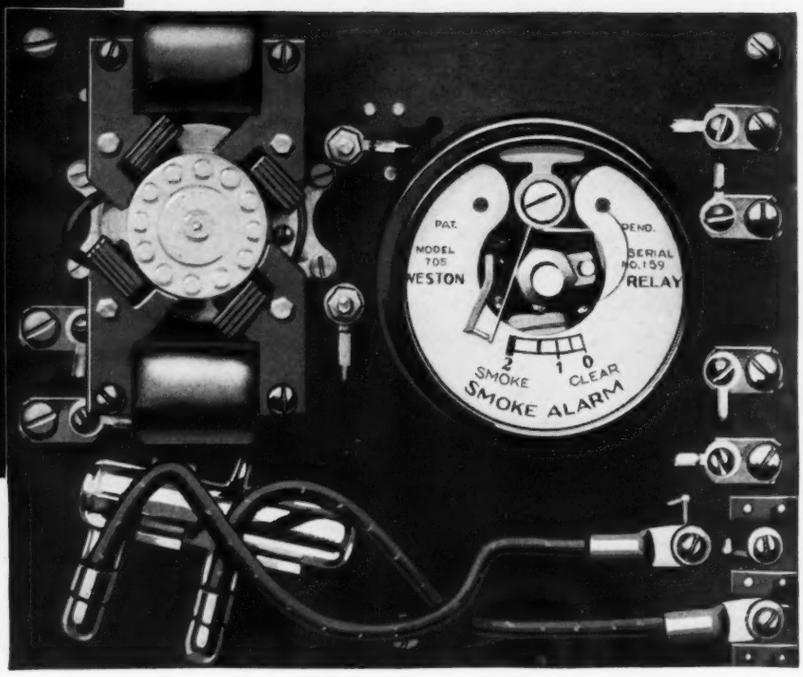
ELECTRICAL WORLD

McGRAW-HILL PUBLISHING COMPANY, INC., NEW YORK CITY. 25 CENTS PER COPY

June 8
1935

EDISON ELECTRIC INSTITUTE REPORT NUMBER

Smoke.. fumes.. vapors..



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Contents Copyrighted, 1935, by McGraw-Hill Publishing Company, Inc.

ELECTRICAL WORLD—Published every other Saturday. Price 25 cents a copy. Subscription rates: United States, Mexico, Central and South American countries, $4 a year; Canada, including duty, $5 a year; all other countries, $6 or 24 shillings, a year. Entered as second-class matter, January 20, 1907, at Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U.S.A.

Branch Offices: 510 North Michigan Ave., Chicago; 883 Mission St., San Francisco; Aldwych House, Aldwych, London, W.C. 2; Washington; Philadelphia; Cleveland; Detroit; St. Louis; Boston; Greenville, S. C.

Printed by The Schweinler Press, N. Y.

McGRAW-HILL PUBLISHING COMPANY, INC.

330 West 42d Street, New York, N. Y.

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LETTERS TO THE EDITOR

Network Cables

To the Editor of ELECTRICAL WORLD:

The subject of lower distribution costs is receiving nation-wide publicity as a result of the recent studies made by the Federal Power Commission and the New York State Power Authority. Public utility engineers are more than ever before being compelled to live up to the popular definition of an engineer; *i.e.*, "An engineer is a man who can do for one dollar what any damn fool can do for two."

Hence the great interest in non-leaded low-voltage secondary cables. While the oil-impregnated paper-leaded cable was very popular for a number of years, the tremendous drop in the price of rubber brought the cost of rubber-leaded cables down so much below that of paper as to force paper into second place. But the trend toward a lower cost cable continued and non-leaded rubber cables were tried out. The relative costs of the three classes of cable at present are as follows: Non-leaded rubber, 100 per cent; leaded rubber, 124 per cent; leaded paper, 137 per cent.

During the past ten years the New York Edison Company has purchased for use in the Borough of Queens 7,784,500 ft. of single-conductor 500,000-circ.mil non-leaded rubber-insulated cable from six manufacturers as per the accompanying table.

Up to 1930 standard A.S.T.M. 30 per cent dry-mineral rubber insulation, with rubber-filled tape and cotton braid, was used. From 1930 to 1934 30 per cent Performance type rubber insulation was used. (This type of compound uses 30 per cent of new rubber with the addition of various anti-oxidants and accelerators which are intended to give better aging qualities to the compound.) During 1934 special compounds were purchased which were designed to give greater protection against the deteriorating effects of moisture, acids, alkalis, oil, heat and oxidation. The operating results to date compare favorably with the leaded constructions.

The ideal network cable has not as yet been developed, therefore the wise purchasing agent chooses from the large number of available constructions those few which meet the specifications of his engineers and satisfy the commercial requirements of low cost.

DAVID WILLIAMS,
Assistant Purchasing Engineer,
Cable Division,
New York Edison Co.,
4 Irving Place, New York.

•

Utilizing Waste Heat

To the Editor of ELECTRICAL WORLD:

Many studies of waste-heat power generation look attractive on paper, but too often the factory operates at reduced capacity, and then the waste heat decreases or, perchance, ceases to exist. If an auxiliary stand-by heat source must be provided, the total investment may become exorbitant and unwarranted.

In any case the study should cover the availability of waste heat under all conditions of production—from prosperity's peak to the pit of depression. Strange as it may seem, people often forget that we live in a changing world. What is true today may not be tomorrow. Often someone takes a cross-section of the moment and forgets trends. He figures on a private power plant *today* in comparison with purchased power *today* and fails to observe that utility rates have averaged a 30 per cent decrease in the last dozen years. This trend deserves serious consideration when thinking of long-time commitments.

Another fact often overlooked is that any power produced by an industry which purchases a part of its energy must compete with the low end of the utility's rate and not with the average unit price of the purchased current. The "increment" cost of added load is nearly always lower than the average price, because it is at a lower point on the rate scale and also because load additions tend to improve the power factor and load factor of all the purchased energy.

During the past five years many industrial plant executives in this country became sadly aware of the fact that fixed charges on private generating plants continue after the factory wheels quit turning. All they could hear was the clock and with each tick interest charges were piling up.

Pure engineering facts and findings never can adequately answer these questions. Political, social and economic trends have to be considered now more than ever.

When all these factors are favorable to waste-heat power generation, it should be developed. Even then it will frequently be found most economical to all involved to do so on some co-operative basis of ownership or operation. In most cases the best method is for the utility to lease and operate the industrial plant, purchasing waste heat when it is available and in turn selling both heat and power to the industry. This arrangement is usually favored because the utility can depend on a plant which it operates itself, and such operation might save utility investment. On the other hand, "interconnection" with a plant which the utility does not operate does not save investment because the utility is not always sure it could borrow capacity from the interconnection when the emergency demands. But that's another story.

Some one has said: "It is difficult to save waste heat and save dollars at the same time." But of course there are exceptions.

A. D. MCLAY,
Sales Engineer,
Detroit Edison Company.

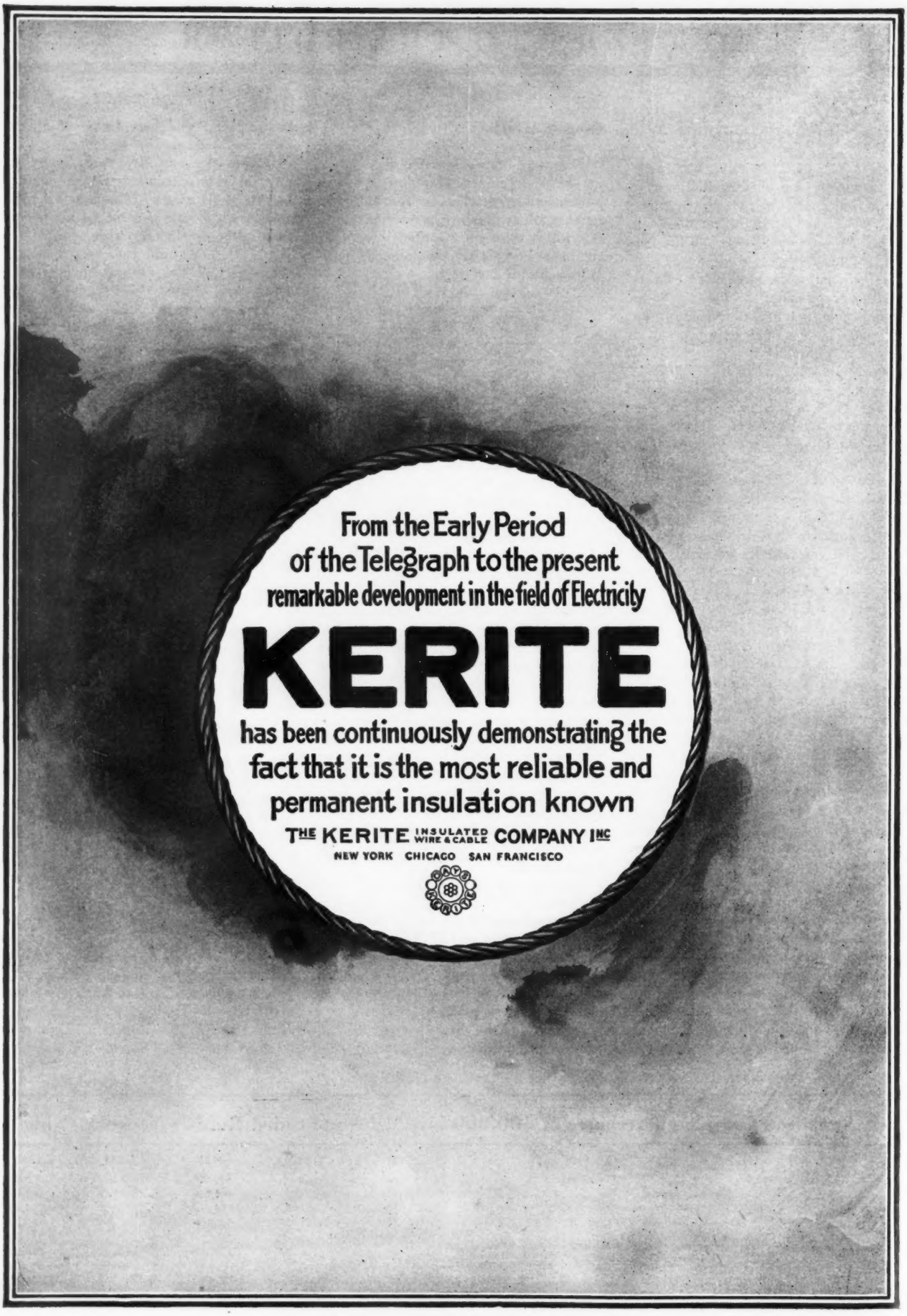
•

Correction

Due to oversight, the name of the author of "Electric Enameling Extended," which appeared in the April 27 issue, was omitted. He is J. W. O'Nan, industrial electric sales section, Duquesne Light Company.—[EDITORS.]

N. Y. Edison Company Purchases of 500,000-Circ.Mil Non-Leaded Rubber Network Cable

Mfr.	1925	1926	1927	1929	1930	1931	1932	1933	1934	Total
1	10,000	.....	.....	30,000	.....	350,000	1,350,000	500,000	218,000	2,458,000
2	.....	.....	.....	.....	.....	100,000	.....	900,000	1,160,000	2,160,000
3	.....	13,500	.....	.....	200,000	225,000	600,000	380,000	172,000	1,590,500
4	.....	.....	120,000	.....	.....	125,000	.....	500,000	221,000	966,000
5	.....	.....	.....	.....	.....	390,000	.....	.....	.....	390,000
6	.....	.....	.....	.....	.....	.....	.....	220,000	.....	220,000
	10,000	13,500	120,000	30,000	200,000	1,190,000	1,950,000	2,500,000	1,771,000	7,784,500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MANAGEMENT • ENGINEERING • OPERATION • UTILIZATION

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JUNE 8, 1935

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With Courage and Confidence

THE Edison Electric Institute at Atlantic City this week marked a turning point in utility affairs. It was a stimulating tonic to all in attendance. It was a morale builder. For the industry was vital in attitude and action. It took two definite stands. One was to fight to the last against the persecutors of the industry who are now known. Their purpose to destroy private utility enterprise is without disguise. The other was to go after business and expand electric service in all markets. Both actions are to be intelligent, organized and effective. As so aptly put by President McCarter, "the kid glove stage has passed."

The tangible parts of the addresses and discussions are presented in this issue. These were timely and well received. But only those in attendance could get the spirit and optimism that prevailed. There was hope and victory in the atmosphere. There was a revival of good cheer. Courageous action has its being in the morale and spirit so evident at this meeting. Leadership has come to the front. The best proof of a revived and invigorated industry was found in the unexpectedly large attendance and in the repetitive exclamations of those at the meeting: "This is wonderful, I am surprised and delighted, we are going places."

AN ANALYSIS of the program showed several dominant topics to be the center of interest. Affairs in Washington, with a focus on the Wheeler-Rayburn bill, were discussed ably and at length. The step-by-step program to socialize and to destroy the industry was exposed. The sources of this persecution of the industry were traced to their hitherto hidden lairs and were shown to be few in number and without a public following in their endeavors to destroy the industry. The injustice of the Wheeler-Rayburn bill was exposed. All these topics were discussed competently and in a spirit of hope instead of despair. There is no longer talk of surrender, the plans are those of victory.

Of equal rating with political affairs was the discussion of business expansion. Executives told how they had sold and expected to sell in the future. Sample stories told of getting business at an unprecedented rate in the domestic market and the Coffin Award to the Tennessee Electric Power Company affords tangible evidence of the results that are obtained in this kind of selling effort. The industry has become salesminded as never before and is taking action accordingly.

REMODELING power stations, rural electrification, air conditioning, standards of system construction to give quality service, rates, lighting and building good will were other topics that went to make up an unusually good program. A normal pulse is beating in a body that has overcome the malaria of depression and persecution.

The industry has gone to work to expand and perfect its organization and its functions. It has left its trenches and is carrying the fight to the enemy. It has regained faith in itself and in the ultimate victory of truth and justice. It has become again an industry of action. This meeting deserves to be underscored in the book that records outstanding milestones in the history of the utilities.

President McCarter truly said "be of good cheer." It was the dawn of a new day in industry affairs.

·TRENDS·

Death to the Blue Eagle

THE madness that was NRA has passed. A legal monstrosity, an economic fallacy and a political hocus-pocus took the form of the Blue Eagle. The decision of the court was the headstone for a bird already buried. Now industry is ready for voluntary bargains. May it act sanely and wisely.

Design for Living Without Code

UTILITIES never had a code, but they by no means escaped the maneuverings around the edges. Dealings with government agencies lead to many inanities that would make a ludicrous story if told. At the convention many tales of near-asininity were related about the circuitous paths followed when a code-conscious lighthouse service or conservation camp moved to get a simple service of some sort from a utility that fell outside the pale of favored coded industries. A way was usually found, but it often involved a multitude of signatures and a sheaf of papers to prove something or other. Nine men in Washington have decreed that all this subterfuge and camouflage are to be a matter of history.

No Price-Index Valuations

PRICES for over-the-counter goods can bounce up and down, but they will not carry utility values with them. The Supreme Court has just said that a commodity price index is no sound sole basis for fixing utility valuations for rate purposes. The case was a Maryland telephone case. One more element of disturbing uncertainty is thus eliminated from rates. Stability in system value is just as important as stability in system operation. New brakes for one and new breakers for the other.

Give Our Boys a Chance

EVERY country's profoundest hopes are centered in the welfare of its youth. In them there lives the promise for the future. Of serious import, then, are the words of Dr. Karl Compton, president of the Massachusetts Institute of Technology, to the graduating class: "Some of you are going to be electrical engineers. Your situation at the present moment is not entirely happy, as indicated by the manner in which jobs in this field are conspicuous by their absence on account of the depressing effect on the electrical industry of the threatening clouds of confiscatory or paralyzing federal legislation and of Government competition in the public utility game—the Government holding the loaded dice."

Data Nobody Knows

WHAT is the physical life of light and power equipment? What is the economic life? These two questions confront the industry, but no one has the answers. Particular equipment in individual instances give some data. But on a general basis a generator, switch, tower, conductor, pole, transformer, insulator, relay, motor and a host of other items is an unknown as to both physical life and economic life. Those installed in past years still work. The new ones have no life history and are vastly different. We pity the commission, the accountant and the lawyer who tries to apply actuarial data to light and power equipment. The fact to hold on to is that gross obsolescence and gross maintenance are increasing in magnitude and importance. Essentially this means it is economical to buy new and improved equipment to replace the old.

Sweat of the Brow

MAN may earn his living by the sweat of his brow, but he doesn't like to. Not when air conditioning is available. Hot weather is here. Air conditioning is here. The two should meet on a sales contract form.

Pump the Water

ALL the work on rural electrification reduces to the use of electrical products on the farm. We give first place to the replacement of the "old oaken bucket." Electric water pumping is a primary convenience on a farm. The next thing is a modern bathroom to replace the old swimming hole.

Revival in Industrial Power

A SURVEY of 40 utilities with 13,500 industrial customers and a total sale of 8,000,000,000 kw.-hr. shows that 348 new industries of more than 50 kw. capacity came on their lines in 1933 and 1934, taking 500,000,000 kw.-hr. Only thirteen new industries were started in their territories using their own private plants. In 1934, for these same utilities, 200 old industrial customers started operations again as a gain over 1933 conditions. In other words, industry is going into action, new industries are being created and central-station power practically has the field to itself. Who exaggerates private plant competition?

Air-Condition and Physiology

ONE weakness in the air-conditioning program has been the lack of factual knowledge about the tangible physiological benefits to those who live and work in a conditioned atmosphere. One of the medical schools is said to have corraled some money to support a laboratory in which to study this problem intensively. It savors of the old tests to determine whether alcohol is a food, a fuel or just a stimulant. Maybe it will be found that air conditioning is intoxicating, and even contagious.

Speeding Up

STEADILY though slowly the industries are increasing their use of electrical energy, and that means increased production of goods. For four consecutive weeks in May the output of central stations was virtually constant and, what is equally significant, was up to the April average, despite lengthening daylight. Last year's operations are being consistently exceeded by a comfortable margin. The industrial system is a ponderous and intricate mechanism.

The Editors Use a Spotlight on Current Happenings

It slowed down gradually; it can only gradually speed up. Attempts to accelerate any part of it too rapidly cause strains. That is unfortunate for hopes of quick recovery but it seems to be unavoidable. Persistent and cooperative effort all along the line is the one way toward full speed.

Octuplets

ONE reader wrote in this week asking for more details than we were able to give about each of the multitude of new products assembled in the May 25 Exhibit-in-Print issue. He wanted to know more, not about one but eight. We call that pretty good response.

Year of Achievement

THEY all wish to belong to the "Hustling Oligarchy of Order Hounds" down on the Alabama Power system. A booklet entitled "This Year of Achievement" told us about it. This company is sales minded. Here are some of the May to December, 1935, quotas that will be made: 1,900 ranges, 1,090 water heaters, 200 washers, 60 ironers, 100 pumps and 4,916 refrigerators.

Building

WE LIKE the number of speakers who used the word building in their addresses. It is an action word. It is constructive. Building sales, building rural lines, building good will, building plants, building rates. When an industry starts out "building" it is going somewhere.

Static Harnessed for Lights?

THREATS to security of electric power never cease. Here is the latest couched in an invitation to come and see an inventor's new machine demonstrated. All the machine does is to take ". . . static from the air and ground by means of my newly discovered tubes and other equipment and produces its own lighting power, provides for radio reception and wireless telephone communication." If we go we will report more about it.

Industries Modernizing

MODERNIZATION and rehabilitation of industrial plants is rapidly increasing the sales volume of electrical supplies. That seems to be the principal reason why gains of 20 to 35 per cent were made in the first four months of 1935 compared with 1934. In some items the increase was as high as 50 to 70 per cent. The rise began in the summer of 1933 and resulted in 1934 volume exceeding that of the preceding year by 30 to 40 per cent. The recent gain has been even more pronounced. In addition many of the heavy industries which have been dormant are reported to be coming into the market for turbines, generators and other equipment.

Quick, Inexpensive and Necessary

RUGGED individualism is liked by the engineer, but it is outdated. A few men became famous as engineers without formal education and without reading the literature of their profession. They were remarkable. But today there is collaboration and co-operation in the profession. There must be quick, inexpensive and open exchange of ideas, data and practices if each engineer is to make best progress. This service stimulates individual ingenuity and initiative. It is the nervous system of the profession. It is rendered by the technical and trade publications.

Capacity and Service

ENGINEERS discussed two important topics. One was modernization and more capacity in power stations. The other raised the question of building systems for the highest possible standards of service—more load and better service. These go hand-in-hand with increased business and indicate that expansion is on the horizon.

Selling People

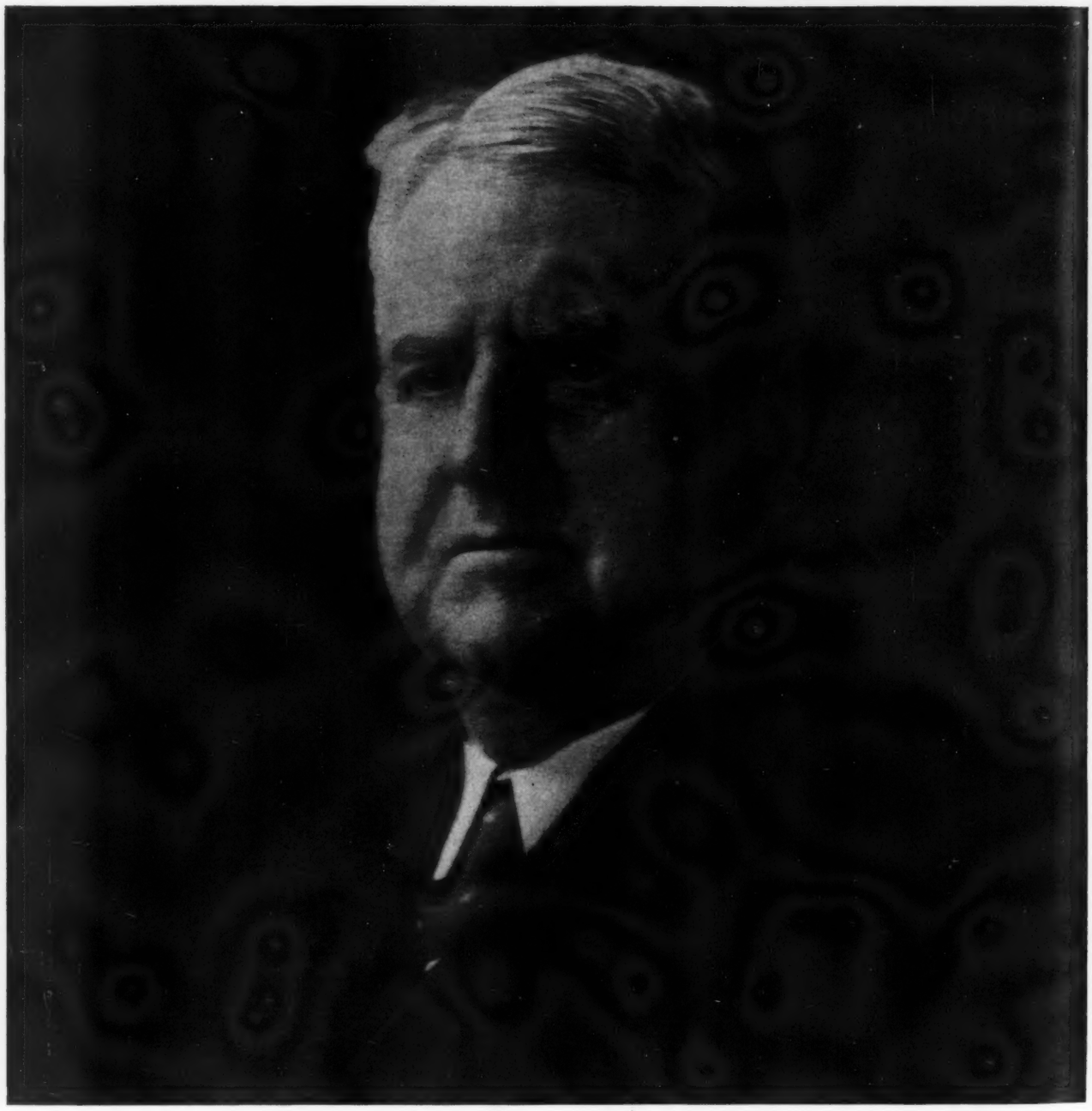
CHALLENGING the famous rubber yardstick, ironically, right in its own front yard, the Tennessee Electric Power Company has shown how to salvage the loss threatened by a radical reduction of rates. It cultivated public good will by patiently explaining savings and opportunities for more conveniences; it enlisted the efforts of the whole corps of employees, putting them all in the way of earning additional income, and thereby greatly expanded its sales of energy. In the marketing of appliances it cooperated with dealers, the TVA and the EHFA. The story tells of thoughtful planning and effective execution. But, more fundamentally, it discloses a human understanding that in large measure accounts for the success achieved.

Watch Out, Mother Nature

THE atomic physicists are all aglow. New measurements at Cornell and Cambridge show that the law of equivalence of mass to energy is sound. Mass and energy are the same things in different guises and change from one to the other on a balanced basis. Einstein said this was so. Previous measurements did not bear it out. But there was an error in measurement that has been corrected. Now the law is confirmed. Pure science, yes, but who knows where it will lead?

Warmth for T.V.A.

WHILE the Norris-McCarl controversy rages about T.V.A. it is interesting to hear what H. W. Fuller and E. B. Whitman contribute. They add specific data to support the McCarl comments. Economic facts and not electric heat will create the greatest warmth in the valley of social vision.

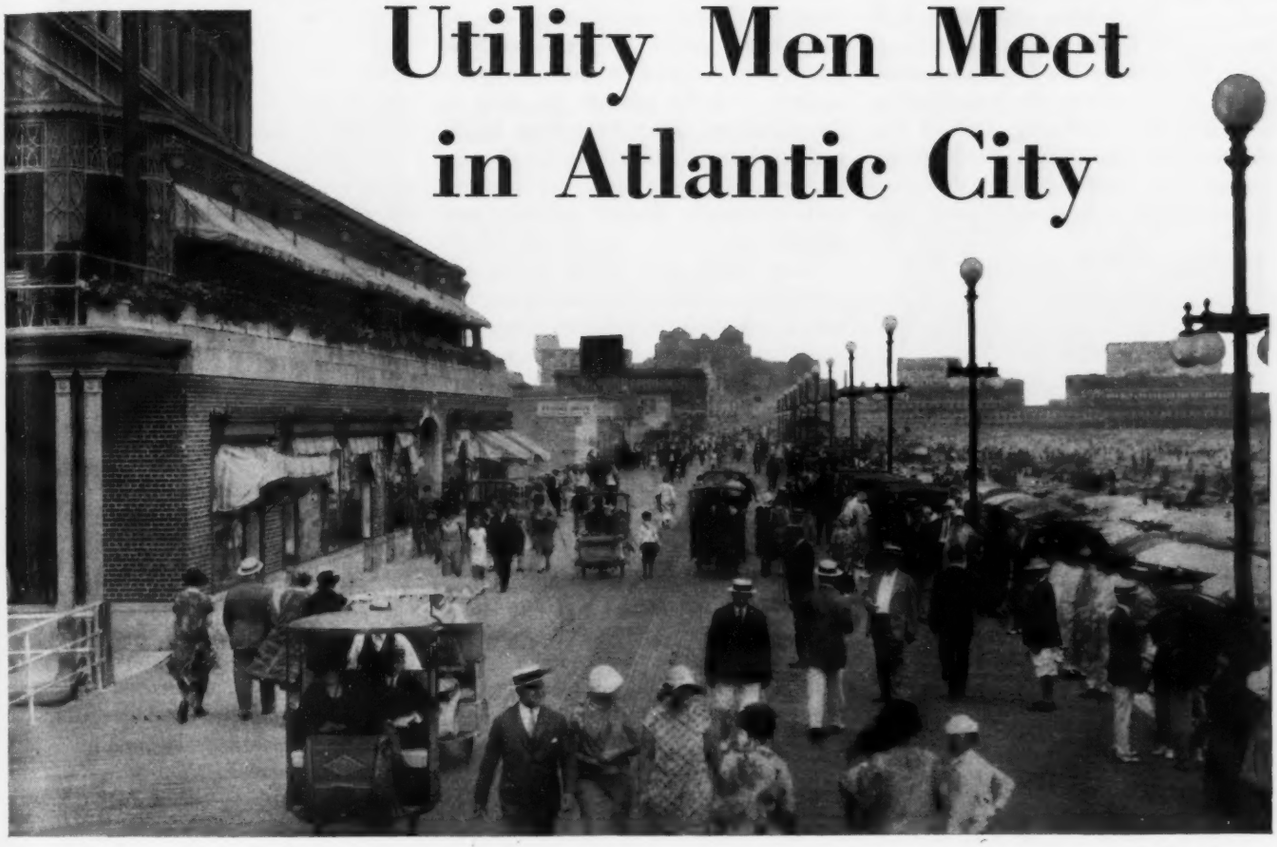


THOMAS N. McCARTER

RE-ELECTED PRESIDENT OF THE EDISON ELECTRIC INSTITUTE

"I make bold to say that the attitude of the Administration with reference to this particular industry is doing more harm to recovery, generally speaking, than all the expenditures of money and other palliatives coming out of Congress are doing good."

Utility Men Meet in Atlantic City



Edison Institute Meeting Draws 1,500 Utility Men —Go to the Mat With Washington—Selling Chosen as a Way Out—Show New Spirit and Confidence

A SPLENDID MEETING of 1,500 utility men was held at Atlantic City this week. They came to the E.E.I. convention in a time of trial and difficulty just after the NRA decision and amid the Wheeler-Rayburn fight. They left full of optimism and courage because of the splendid program, the leadership exhibited and the contagious atmosphere that was generated. The true function of a convention was established by this gathering. It was informative and stimulating. It permitted an interchange of ideas and focussed action on constructive efforts to improve the position of the industry.

This meeting went far beyond any one's expectations in the number in attendance and in quality and spirit. It was interesting to note the reaction of all who attended. There was a growth from surprise and astonishment to overwhelming enthusiasm that reached its climax at the fine meeting on Wednesday night. The presidential address of President McCarter gave the keynote to the meeting and his spirit of confidence, action and progress despite difficulties was reflected in all papers and all discussions.

Essentially the meeting treated of three outstanding topics: (1) Washington and its action; (2) internal engineering and economics of utility systems, and, (3) selling in all markets. With respect to all three the attitude and action was the same. Squarely recognizing difficulties, faces were turned toward aggression and expansion instead of defense and despair too frequently encountered in recent meetings. The will was here to do things, to overcome difficulties, to force solutions to problems.

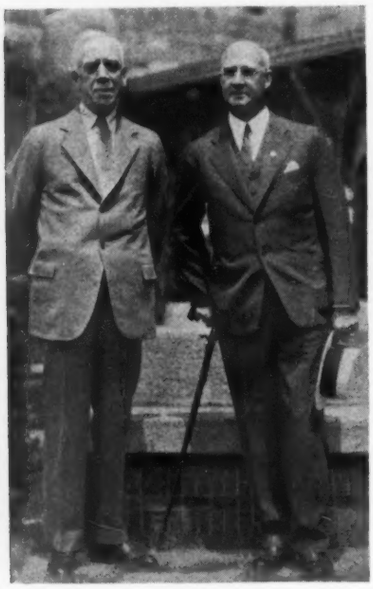
Out of Washington

With respect to Washington, the attitude was clearly that of confidence that the persecutors of the industry, with their purpose to socialize it, would not succeed in their endeavors. These men are now known, their purpose has been exposed, the utilities have presented the true facts. There is no public demand for the Washington persecution. It has its only effective motive power in the person of the President, who, as Mr. McCarter said, seems to have an obsession on the subject.

The entire Washington situation was carefully presented and discussed. Merle Thorpe gave a masterpiece in his analysis of the basic situation that every citizen should read. This served to orient the utility problem in terms of the entire situation. The Wheeler-Rayburn experience and its present status was discussed at length on Wednesday night by G. M. Gadsby and J. G. Holtzclaw, whose formal papers show clearly the destructive features of the act and the true intent and purpose of its sponsors. All disguise was stripped from the issue and the unanimous decision was to fight

and keep on fighting against a bill that was not in the public interest.

A high point in the floor discussion at this meeting was the contribution of George B. Cortelyou. Out of his wisdom and experience he inspired courage and hope that truly deserved the admirable compliment paid him



H. W. Fuller, Chicago, and J. E. Davidson, Omaha

by President T. N. McCarter. This session showed that utility leadership was available and knew what and how to go about securing justice for the industry.

The errors, inconsistencies and false premises of T.V.A. rates were shown by E. B. Whitman in a thorough factual analysis. These data are indicative of what is now and will be available to give the public the facts about the T.V.A. And H. W. Fuller in his paper made a superb factual analysis of the subsidized government electric plants — another contribution that should be amended and continued as the data develop. Month by month the facts about government in the utility business are coming to light and will be studied by the public. There is no fear of the future. The political actions and the subsidized actions are based upon false standards and weak foundations.

Rural electrification is the latest subsidy out of Washington. As yet it is in the embryonic stage, but H. W. Reed, in his paper, gave a splendid summary of the present status and some wise counsel. Messrs. Kelly, Easter and Powers contributed greatly to this subject in their prepared discussions. Rural electrification can be magnified quickly to great political importance, whatever its economic failings, and the utilities are alert to the situation. They have been building rural lines and giving rural service, and here again facts, not theories, will eventually dictate practice and policy.

Thus Washington affairs as regards legislation, rural electrification and subsidized projects received competent attention and discussion. They were brought into sharp focus and made clear. The utilities welcome any needed and fair regulation; they will co-operate in every way with the idea of greater electrification in this country, but they will not be misled by visionary schemes nor suffer the public to be indoctrinated to its detriment without taking action. There is a policy and a leadership that speaks well for the ultimate decision.

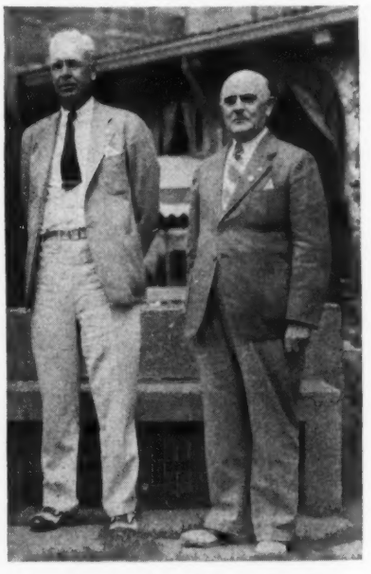
Internal problems of the utilities received attention in several papers and discussions. N. E. Funk discussed the influence of service standards and service quality on construction and design standards and costs. This is a very important consideration and is not always properly evaluated. Continuous service and good voltage regulation do not just happen. They are matters of plan, engineering and large expenditures for facilities. Rural electrification schemes may well take note of this fact. On the general utility system there is opportunity for service improvements and some cost reductions and the advent of new and improved devices helps out, but it seems that the demand for quality and intensified use increases at a rate to offset these improvements. W. E. Mitchell and H. R. Woodrow discussed the topic to give good suggestions to supplement those of Mr. Funk.

In the same category was the paper of Marion Penn on power plant modernization. He took off his gloves to show the fallacy of the Federal Power Commission "war scare" claims, outlined the types and applications of the several equipments now available to increase station capacity or to reduce station costs and told what had been done on the Public Service system. A. D. Bailey, A. H. Kehoe, J. M. Drabelle and F. S. Clark contributed prepared discussions. While fuel economies alone are difficult to obtain in a magnitude sufficient to justify expenditures for power plant modernization, the combination of fuel economy and need of more capacity will justify these expenditures and much can be done to existing plants to carry out this economic move.

Aside from these two able papers there was another by Frank McLaughlin that discussed building good will for local properties. The story is not new and the methods are well known, but they should be applied these days. J. F. Owens contributed a splendid discussion of this topic.

Selling—the way out

Get the load and revenue. No meeting in recent years has been so positive and aggressive in its commercial program. Executives and sales managers talked practical selling and showed samples of results that had been obtained. There was no contentment with present business and present revenues. There was a unanimous expression of a desire and an intent to sell into every possible market rapidly and in volume. H. P. J. Steinmetz told of the splendid work of the sales committee. C. E. Michel and G. C. Estill cited samples of selling on their properties that were astonishing in magnitude. P. B. Zimmerman urged concentration on the electric kitchen and cited customer-appeals as well as utility benefits. S. G. Hibben talked of the sales possibilities of the new vapor illuminants. And Jo C. Guild, Jr., told about the sales work of the Tennessee Electric Power Co. Every possible sales lever is be-



J. T. Barron and E. B. Meyer, Newark

G. C. Estill
Miami

J. C. Guild, Jr.
Chattanooga

ing used, some 1,900 employees sell and so do the officers. It was readily seen how some 200 kw.-hr. a year can be put on the average domestic consumption with this kind of selling. This company well deserved the Coffin Award and the ceremony of presentation was a wholehearted congratulation and commendation from those present and the committee.

There is going to be a big commercial surge forward in the industry. The local property selling samples were convincing, the sales committee plans and recommendations were sound. The time is ripe for individual and co-operative selling on a greatly augmented scale in every market. Needless to say, rates are part of this sales situation. Frank A. Newton gave a fine survey of the rate situation and once again the rate research committee advocated promotional and inducement rates to build load. Prize awards were made this year and the quality of the work done to earn the rewards was never higher. This human touch of "well done" is an ultimate part of the many features of the meeting that made it a success.

But there were other features. Some 350 ladies were in attendance. They had a good time and gave the needed social note to both work and play. There were some 300 manufacturers and allied industry executives present who were unanimous in their commendation of the meeting and who were delighted with the new spirit of aggression and progress that permeated the utility ranks.

And one cannot close this report without paying tribute to President McCarter. He has held office in a trying year. He has worked aggressively for the benefit of the industry. It was his fire, spirit and encouragement, so well exemplified in his presidential address, that struck the note maintained at all sessions of this meeting. The E.E.I. is indeed fortunate in having him carry on again this year as president.

Attacks Federal Trade Findings

McLaughlin points road to better public relations — Funk emphasizes service — Requirement deterrents to "cheap" service — Penn advocates modernization rather than new stations.

THE unfair conduct of the Federal Trade Commission's investigation of utility companies and the misrepresentations and misstatements in its final report aroused scathing denunciation by Bernard F. Weadock, managing director of the E.E.I. In part, he said:

"The fair determination of an economic question is at best difficult even when approached with an impartial and open mind. When, however, that judgment is prejudiced or biased, the solution of the economic question will reflect such prejudice and bias. The Federal Trade Commission is no exception to this rule. It patterned its conduct of the investigation of the electric light and power industry in spirit and practice after the manner of a congressional inquisition and not according to the time-honored proceedings of a judicial or quasi-judicial body. It would seem that the commission had as its only purpose, despite its protests to the contrary, to besmirch this industry to the degree demanded by those who sponsored the investigation."

After presenting various evidence to support his statements, he closed by saying:

"I am unable to find more suitable words than these—fraud, deceit, misrepresentation, dishonesty, breach of trust and oppression—in characterizing the investigation by and 'findings' of the Federal Trade Commission."

Characterizing the government as "competitor, taxer, regulator, oppressor and executioner," Frank McLaughlin, president Puget Sound Power & Light Company, said:

"We are today fighting in the front line trenches. If we don't win our battle, I'm afraid there will be many more in the trenches and 'ere long there will be many a white cross piled row on row, marking the sad end of America as we have known and loved

H. W. Wagner
Baltimore

A. C. Marshall
Detroit

W. H. Taylor
Philadelphia

J. F. Owens
Oklahoma City

it. We are fighting today not only to preserve the invested savings of millions of splendid, thrifty citizens, and for the right to live on the merits of our performance in the public interest, but for the still bigger thing—the preservation of this country as a land of opportunity, where a free people may benefit from their efforts in proportion to their contribution to the welfare of mankind.

Discussing Mr. McLaughlin's paper, J. F. Owens, president Oklahoma Gas & Electric Company, emphasized that lack of understanding breeds discord and strife, and that without good will business cannot be successful. However, he expressed the opinion that the Wheeler-Rayburn bill has not been an unmixed evil, as many newspapers have indicated their opinion that utilities are being persecuted. Mr. Owens urges every member to transmit a complete copy of Mr. Weadock's address to every newspaper editor in every territory.

Coffin Award to Tennessee Electric Power
Gerard Swope, Jo Guild and F. W. Smith

Effect of service standards on system design

Cheap substandard systems can be built to supply power, admitted N. E. Funk, vice-president engineering, Philadelphia Electric Company, but the public and industries would never submit to the service from them, no matter how low the cost. Continuity of service, good voltage regulation and safety are the major requirements whose fulfilment make electric service systems cost what they do.

Discussions of his paper were presented by H. R. Woodrow, vice-president Brooklyn Edison Company, and W. E. Mitchell, vice-president Georgia Power Company.

Mr. Woodrow reminded his audience that load building cannot be successful unless the service is so good that the customers are generally satisfied. But it is not sufficient to wait for complaints. Tests should be periodically made to ascertain facts. When considering improvements in service, however, the cost of service must be balanced against the customer's valuation of the improvement. Since many high-voltage complaints have been found due to use of old lamps, he recommended tagging all lamps with date of sale.

W. E. Mitchell's discussion, presented elsewhere in this issue, pointed out that industrial power customers are greatly inconvenienced by their instantaneous relays tripping out equipment when there are only momentary service outages that equipment would ride through if equipped with time-delay relays or unloading devices.

Modernization versus new stations

A vigorous refutation of the Federal Power Commission's contention —that installation of new generating stations should be started immediately to avoid power shortage in the near future—formed the opening part of an excellent address on modernization of stations by Marion Penn, Public Service Electric & Gas Company of New Jersey. Obsolete stations and interconnections can carry considerably larger peak loads than at present. Modernization of existing plants, rather than building new stations, is his recommendation for increasing capacity when needed. It can be done quicker and with greater utilization of existing investment.

In general, Mr. Penn was supported in his statements by A. D. Bailey, Commonwealth Edison Company (see discussion elsewhere); A. H. Kehoe, New York Edison Company; J. M. Drabelle, Iowa Electric Light & Power Company, and F. S. Clark, Stone & Webster Engineering Corporation.

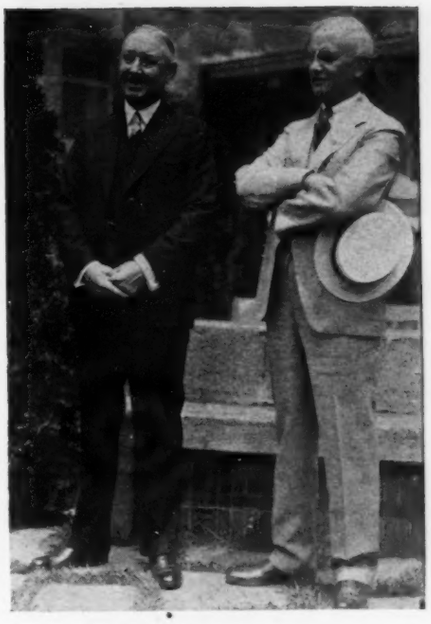
Mr. Kehoe declared that Mr. Penn's paper is very valuable tangible proof of the incorrectness of the government announcement that there is a power shortage. If utilities acted on the government recommendation, they would be open to criticism for installing overcapacity. The load duration on non-base load stations is greatly misunderstood publicly, he declared. On one large system loads exceeding 80 per cent of the peak value occurred less than 500 hours per year. Use of obsolete generating equipment is the most economical way of securing peak loads, he contended.

F. S. Clark declared that with kw.-hr. consumption near 1929-1930 rates, the time is coming for capacity increases. New stations are the most costly way, because new locations entail establishment of new distribution centers, whereas modernization of old stations can retain in use considerable of the old investment. Since old equipment is underrated in the light of present practice, minor changes can increase capacity and efficiency. He suggests careful consideration of superposing non-condensing turbines, although they may not be suitable for use with the regenerative cycle and may be less efficient than modern units of same pressure range.

Mr. Drabelle declared that the Federal Power Commission, by various assumptions and elaborations, has tried to justify expenditure of the tax-

payers' money for government projects. Superposition of high-temperature, high-pressure units on existing units was recommended, although it requires changes in boiler units and fuel burning.

Mr. McCarter, in closing the discussion, pointed out that while the government is trying to justify increases in capacity, some state commissions are endeavoring to write off the investment in standby capacity.



E. W. Lloyd and G. H. Jones
Chicago

Forging Ahead With Confidence

McCarter address stirs courage — Thorpe paints escape from despotism — Guild shows how to get Coffin Award — Newton advocates objective rate

WITH the prospect that we are not, after all, to be regimented forever by a colossal bureaucracy in Washington, the electrical industry shares with all others a more hopeful outlook. President McCarter ended his presidential address with the words, "Justice and truth are upon our side and the right will prevail. Therefore, be of good cheer." He was able to say this even after reciting the sequence of events which together constitute the most pernicious and sustained assault of politics against an industry in the history of the country. He began the recount with the shift of the 3 per cent energy tax to the companies and with the Johnson bill which deprives the utilities of the right to ask injunctions in federal courts against confiscatory rate decisions until the avenues available in state courts have been exhausted.

In quick succession followed the rate survey by the Federal Power Commission, the "monstrous" T.V.A. project, with all its ramifications and excesses; the coterie of other hydro projects from Maine to Oregon—$730,000,000 worth—and the P.W.A. grants to foster municipal competition. This was enough to get up the "dander" of the industry and the Baker-Beck report ensued, to confirm the industry's conviction that much of the government program of attack would not stand scrutiny in the light of the Constitution.

Philip Sporn and Graham Claytor
New York City

Every gesture of co-operation by the industry has been matched by a gesture of malicious propaganda on the part of the Administration agencies in the form of news releases, bill drafts and pronunciamentos that came staccato out of Washington.

Topping all these rebuffs and innuendoes were the Wheeler and Rayburn bills. Mr. McCarter put special emphasis on the warning that Title II would, if enacted and sustained, mean the end of state regulation and the end of private operation of electric utilities. On the other hand, the institute's president said he had no hesitancy in saying that the bill in anything like its present form would be declared invalid except as to the supervision and regulation over the energy transactions which take place in very limited magnitudes across state lines.

Utterly lacking in popular advocacy, the bill could only be attributed by Mr. McCarter to an obsession on the part of the President of the United States. He said: "His urge of the passage of this bill is all there is to it. If that urge were withdrawn there would be nothing more heard of it." With it withdrawn the electrical industry could help recovery "blossom as do the roses at this season of the year." If it is not drastically modified and the attacks persist it is up to the industry to fight for its preservation and fight without gloves.

How near we have come to communism and fascism was picturesquely demonstrated by Merle Thorpe, editor of *Nation's Business*. Startling similarity was revealed between the principal planks in the New Deal platform and the ten points demanded by Karl Marx in his 1848 manifesto. From the centralized control of credit to the dedication of all land rents to government, he displayed the deadly parallel between our recent Administration measures and the communistic Marxian philosophy. Fascism, on the other hand, was the political corporate model of the 50 corporate agencies instituted by the government, some by quite remotely delegated authority originally delegated in generous manner by Congress. Thorpe said we wanted none of Europe's "isms," we had outstripped all the world in the matter of social security and benevolent distribution of wealth and were just now beginning to realize that we had outdone even ourselves in staging and perpetuating the biggest and best depression any country ever had.

Credit was given to the electrical industry in subtle but pervading terms when the speaker pointed to the contrasts of electrical comforts of America's 22,000,000 homes with the horse-and-buggy, kerosene-can-with-potato-stopper days that carried with them an hour known as lamp-chimney cleaning time. Without so much as

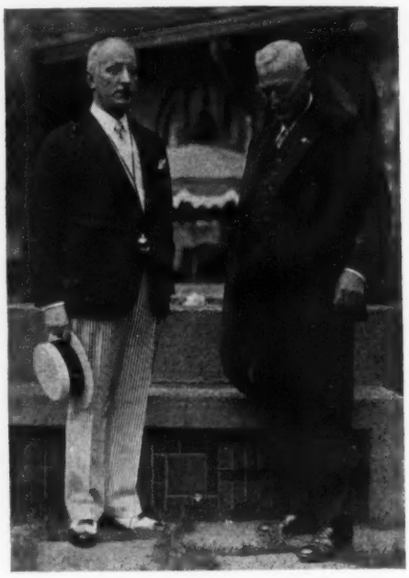
J. F. Fairman, Mrs. Fairman and H. R. Woodrow, Brooklyn

being specific, the well-known editor gave an insight into the latest psychology and the rising disposition to discard the idiocies of a fractious Europe in favor of the solidities we have built up for ourselves.

Recipient of the Coffin Award as it proved to be, it was fitting that the Tennessee Electric Power Company should, through President Jo C. Guild, tell how the company, in the face of T.V.A. and a general low-income-level area, had in 1934 increased by one-third the 1931 high of residential kilowatt-hour sales. Vigorous selling was sensed as the sole answer to a 10 per cent rate reduction on top of an already existing decline. Selling became a function of all employees, and the objective was not dollar volume on merchandise, but energy increase in kilowatt-hours. Executives barnstormed all the territory with the idea, everybody was told the whole story in all its seriousness and all its potentiality. The less the familiarity of non-sales departments with the previous sales technique the more were their ideas adopted so as to enlist their wholehearted participation. Negro track workers on the railway division sold flatirons during their lunch hour, for cash, deliveries by trolley the same afternoon. Sales quintupled. The sales force was doubled in a year, advertising was doubled and "Reddy Kilowatt" went to work for the company.

In the midst of this an agreement with T.V.A. resulted in another rate cut, which required a further intensification of the sales program. Servicing functions were reinforced, dealer relations were bettered rather than harmed by employee selling. On the whole, ranges and refrigerators have increased 50 per cent, water heaters have quadrupled. Energy sales per residence customer have risen 30 per cent in a year. Incidentally, Tennessee ranks 42d in spendable income.

New highs in numbers of domestic customers and in domestic consumption were recorded in 1934, along with a new low in average rate per domestic kilowatt-hour. This was brought out in the report of the rate research committee, read by Chairman Frank A. Newton of the Commonwealth & Southern Corporation. Household use of electricity has actually increased 31 per cent during the depression



W. H. Onken, Brooklyn, and H. J. Gille, Portland

years and the average rate has gone down 16 per cent. Even more significant is the 2-cent rate at which the country as a whole is getting its added domestic kilowatt-hours. No wonder householders applied their forced economy to other things and no wonder there was even more convincing argument for the efficacy of promotional and objective rates.

As for justification for further rate reductions, Mr. Newton pointed out that the recent increase in the food aspect of cost of living per week would pay the family electric bill for five weeks. A 10 per cent decrease in cost of government would pay each family's electric bill and give a cash remainder of $15 besides.

Objective rates, with or without a free current corollary, have been approved by several commissions and their use is strongly recommended by the committee. As for the trend toward rate uniformity over company areas, caution was urged for those territories where there is likelihood that municipalities will apply excise taxes per pole or per meter and thus inject specific differentials. The Michigan commission has warned that local rate differentials may be forced if the municipalities precipitate the inequalities.

M. E. Skinner
Buffalo

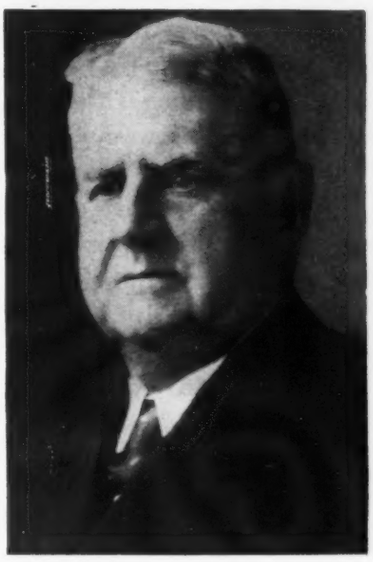
E. C. Edmonston
Baltimore

E. W. Judy
Pittsburgh

Right Will Yet Prevail

Unparalleled Attacks on Utilities Should Yield to Reason—Time Propitious for Administration to Unfetter Electric Companies for Prodigious Contribution Toward Recovery

By
THOMAS N. McCARTER
President Edison Electric Institute
President Public Service Electric & Gas Company, Newark, N. J.



WE ARE assembled in annual convention under the most difficult of circumstances, due to the pending situation at Washington. It is, however, a time for courage and determination on the part of the industry, in which there is no place for faintheartedness or despair. The unexampled record and development of this industry must be continued. It has fifty years of glorious history behind it. Starting from scratch a little more than a half century ago, there has been poured into it a bona fide investment of some twelve or thirteen billions of dollars of the savings of the people of the country. It has built up a gross business of approximately $1,800,000,000 a year. It is giving wonderful service to the nation, at marvelously low rates. It is one of the major industries of the country, ranking fourth in the amount of investment in it, and eleventh in the value of its annual product.

Since the present national Administration was inducted into office there has been launched by it against this industry the most devastating and destructive attack, having for its object the end of private operation of the electric industry, and its nationalizaton under federal direction and ultimate ownership. One step has followed another. In the early days of the present Administration the provision in the revenue act of 1932, providing for a 3 per cent tax on domestic consumers' bills, to be paid by consumers, was transferred to the backs of the companies rendering the service, thus adding to the extraordinary burden of taxation now imposed upon our companies, which in the case of the one with which I am especially familiar aggregates 17 per cent of its gross receipts. Subsequently the so-called Johnson bill was passed, denying to this industry, and to this industry alone, the use of the federal courts as a forum of original jurisdiction, to review orders alleged to fix confiscatory rates, and therefore to be in violation of the federal Constitution.

On April 19, 1934, President Roosevelt signed a joint resolution authorizing funds to enable the Federal Power Commission to conduct a nation-wide investigation of power rates. This proposed investigation was to be in addition to that which the Federal Trade Commission has been carrying on over a period of years.

3% tax and rate survey only curtain raisers

These matters, serious as they are, were only curtain raisers to what has followed.

It should be said in fairness that this Administration is not chargeable with the great Boulder Dam development, authorized and started under the previous Administration. A vast number of people in this country, who look with apprehension upon all government undertakings of this character, have many misgivings as to the results that will flow from this enormous enterprise. But at least it can be said that there were serious questions other than the development of electric power that were involved in this project, as, for example, the impounding of the waters of the Colorado River for vast irrigation and water-supply projects, to which the development of power was largely incidental. The surplus power made available by the undertaking, not needed for the enterprise itself, is to be sold to large adjacent private distributors. Inspired by the determination of the government to undertake this enterprise, the new Administration burst forth with all kinds of similar enterprise in various sections of the country, which, however, are lacking in the fundamental main purposes which the Supreme Court found justified the Boulder Dam experiment.

T.V.A. a forerunner of several projects

The development of the monstrous T.V.A. project and the setting up of the Tennessee Valley Authority came into being. Here, starting with the old Muscle Shoals project as a basis, is an attempt, under assumed authority of law, to harness all the waters of the Tennessee River, and as a result thereof, to produce an enormous quantity of power, available for use in a region now largely oversupplied with power, with the avowed intention of creating, under false bases of accounting, a so-called yardstick of cost of power, which could be accepted by surrounding companies, or in default thereof, they would be

driven out of business. And this same yardstick was to be held up to the people all over the land as a proper measure of the cost of power.

The money spent by the government in the development of this undertaking has already exceeded over $100,000,000, an amount largely in excess of that thus far appropriated. And it was made perfectly apparent at a recent hearing before the military affairs committee of the House of Representatives upon the proposed amendments to this legislation that the Tennessee Valley Authority has proceeded unlawfully and arrogantly, and in contravention of the accounting practices of the Comptroller-General's department, to indulge in activities and spend large sums of money altogether unauthorized by law. More or less similar projects have been undertaken by the government in the Northwest, such as the Bonneville Dam and Grand Coulee Dam on the Columbia River—not to mention such other projects as Fort Peck, Casper-Alcova and Passamoquoddy—the total estimated cost to the government, of which, including Boulder Dam, is approximately $730,000,000. Heaven only knows what the total actual cost will be if and when they are all completed.

The next step aimed at the destruction of this industry was the attempt, under the Public Works Administration of funds appropriated by Congress to bring about national recovery, to make outrights gifts to scattered municipalities of 30 per cent of the cost of a new muncipal plant, together with a loan of the balance of said cost, at low rates of interest, said plants when completed to operate in direct competition with existing facilities operated by private capital.

Institute ceases to be silent

Now the Edison Electric Institute is not a political organization. It is the trade association of the industry. It is a factual, fact-finding research organization, existing for the benefit of its members and the industry in general. When, however, the trustees of this body became fully cognizant of the foregoing facts, it resolved that the time had come for it to act. They believed that some of the various undertakings above referred to were in violation of the constitutional powers of the United States government, and they authorized the employment of the best legal talent that could be secured to advise the institute as to the constitutionality thereof. Accordingly, the Hon. Newton D. Baker of Cleveland, Ohio, formerly Secretary of War, and the Hon. James M. Beck of Washington, D. C., formerly Solicitor-General of the United States, both constitutional lawyers of national reputation, were retained. These gentlemen, after exhaustive study, united in a series of joint opinions, in which they held substantially as follows:

1. That the 3 per cent tax act was constitutional.

2. That the Johnson act was constitutional.

3. That the undertakings of the Tennessee Valley Authority, as authorized by Congress and as, in process of time, carried out by the Tennessee Valley Authority, were beyond the power of Congress, and in defiance of the Constitution of the United States.

4. That the undertaking of the government to make gifts of money and to advance on loan the balance of the cost of municipal plants in competition with legally existing private industry was unconstitutional.

Meanwhile, there had been commenced by preferred-stock holders of the Alabama Power Company, whose property was threatened with destruction by the T.V.A. development, a suit in the federal courts to test the constitutionality of this undertaking. Almost simultaneously with the rendition of the Baker-Beck opinions came the decision of the Hon. W. I. Grubb, Judge of the Federal Court in Alabama, that the activities of the Tennessee Valley Authority were altogether illegal.

I make bold to say that this attitude of the Administration with reference to this particular industry is doing more harm to recovery, generally speaking, than all the expenditures of money and other palliatives coming out of Congress are doing good. If the Administration would announce that this kind of thing was to cease, and that government from henceforth would attend to its own proper activities, and give business a chance to come back, recovery would blossom as do the roses at this time of the year.

Rebuff followed by propaganda blasts by bureaus

At this juncture, backed by the authority of the trustees of the institute, I presented in person to the President of the United States a dignified memorial setting forth the facts that seemed to the trustees to threaten the existence of this industry and appealed to the government for a cessation of this competition, and a get-together policy for the elimination of whatever abuses and wrongs might be found to exist. I accomplished nothing. On the contrary, I was rebuffed by a public statement issued the following day by the chairman of the Federal Power Commission. Meanwhile, statement after statement began to be issued from this or that federal commission attacking the practices of the industry; putting out all kinds of false innuendoes and indulging in a general policy of propaganda against the industry, which, if practiced by the companies in their own defense, would have brought down the severest censure of the government upon them.

The methods and practices of the Federal Trade Commission in conducting its investigation and the various kinds of propaganda engaged in by it were fully described to you by Mr. Weadock, who has been in constant close touch with this investigation from the beginning. He discloses a scandalous perversion of the proper activities of a quasi-judicial tribunal.

Various other litigations have been started in different sections of the country where these gifts and grants, to which I referred, have been made, and in nearly every case the undertaking has been enjoined in the federal court of original jurisdiction. The appeal from Judge Grubb's decision in the Alabama Power Company case will be argued about the middle of June before the Circuit Court of Appeals in that section of the country, and it should reach the Supreme Court of the United States at some time during the next sitting

of that court. The trustees of the institute are prepared to do whatever is necessary to see that this case, and the other injunction cases to which I have referred, receive a full, complete and fair hearing before the courts of appellate jurisdiction.

Now one would think that all this was sufficient to administer a knock-out potion to any industry! But such is not the case. The industry has gone on about its business, is continuing to give the country the best of service at constantly lessening rates, and is increasing its customers and gross revenues. With the desire to be co-operative and helpful in stimulating national recovery, although not operating under a code, the industry with practical unanimity accepted the forty-hour week for labor without diminution of wages, at enormous cost to itself. Now, under the decision of the Supreme Court of the United States, as has from the beginning been anticipated by all thoughtful lawyers, this compulsory code operation, where it exists, and the whole NRA project have been ended. As above stated, our compliance was voluntary, and I strongly recommend to the industry that this voluntary compliance be continued, to the end that the industry may continue to practice whatever benefits there were in this plan, which has now been declared illegal.

NRA decision totters Wheeler-Rayburn structure

But the worst was yet to come! As its final weapon of annihilation, the Administration produced, through the efforts of Messrs. Corcoran and Cohen (who seem to be running the United States these days), and caused to be introduced in both houses, the Wheeler-Rayburn bills, known ineptly as the "holding company bill." These two bills as introduced in the respective houses, though differing somewhat in phraseology, are alike in substance. Title I imposes a death sentence upon holding companies and provides for their destruction within a limited period of time, unless by the action of the new Securities Commission, under certain exceptional circumstances, this or that company should be exempted from the death sentence. And in the meantime it places full control of these holding companies under the control of this commission, as to the issuance of securities, accounting and practically all other details of operation.

How any such contemplated creation of power in a federal commission can survive the logic and reasoning of the decision in the NRA case is beyond my comprehension. In fact, the President himself has stated that in his opinion the NRA decision endangers, if it does not destroy, the whole Securities Commission legislation. Irrespective of its effect upon our industry or any other particular industry, it seems to me that this great decision is nation-saving, for after all we are Americans before we are specialized industrialists and we are not to be forever regimented by a colossal bureaucracy in Washington.

Title II more vicious than Title I

It has been part of the strategy of the Administration to gloss over or minimize the effect of Title II in these bills. And I think the industry itself has not given to this title the importance and publicity which it required. If anything, it is to my mind more dangerous than Title I. Every one who is familiar with the electric business knows that the operating companies in this industry are almost altogether intrastate operating units. For purposes of security of service, economy of plant construction, and what not, they have, however, established certain interstate connections with companies existing in neighboring states, over which small amounts of power pass from time to time, from one company to the other, but such movements are in no sense a matter of retail distribution.

Under the guise of this trifling interstate commerce Title II seeks to place all these companies under the direct supervision and management of the Federal Power Commission, except as to rates over retail distribution. But every other conceivable power that could be given to a regulating commission is bestowed in such cases upon the Federal Power Commission, notwithstanding that it is a complete duplication of the power of the various state commissons. And the bill states in so many words that the local regulation must be subject to the federal regulation. The practical result of this would be to subject the industry to the most minute control of a vast federal bureaucracy, to be exercised (if the present personnel of the Federal Power Commission is a fair criterion) by wholly incompetent persons, altogether unfamiliar with, and ignorant of, the intricacies of the public utility business. It would mean the end of state regulation.

Title II would end private utilities

In view of the decisions of the Supreme Court of the United States with regard to interstate commerce, over a long period of years, culminating in the recent exhaustive opinion of Chief Justice Hughes in the NRA case, I have no hesitancy in predicting that Title II of this act, should it be passed in anything like its present form, will be declared invalid by the Supreme Court of the United States, except as to supervision of and regulation over the relatively infinitesimal amount of current that actually passes over the states lines. If, however, the bill should be passed in its present form and be sustained by the courts, sooner or later it will be an end to the private operation of this industry.

Hearings have been held on the bill before the interstate commerce committee of the House. The hearings were long-continued and fair, and I am satisfied that the majority of that committee are not in favor of the sweeping provisions of the bill as drawn.

Hearings in the Senate committee were hurried and perfunctory, and the bill was immediately reported out by Senator Wheeler and some of his associates. An attempt has been made by those in control of the bill to give the impression that the committee substitute bill in the Senate is very much modified. This is not the fact. Certain changes in language have been made, but the vicious parts of the original bill remain in all their entirety.

Representatives have done masterly job in defense

In its opposition to this proposed legislation, the industry has been splendidly represented in Washington by the voluntary Committee of Public Utility Executives, under the chairmanship of Mr. Gadsden. Its work has been honest, clean, straightforward and effective, and the institute and all connected with the industry are under a sense of obligation to this committee for its splendid presentation of the industry's objections to this legislation. In the maelstrom of legislation which is under consideration in Washington it is difficult for this committee, or any one else, to focus the attention of senators and

representatives, generally speaking, upon the merits or demerits of such legislation. It has become involved in the vortex of politics, and under such circumstances, the real merits or demerits of legislation are not always considered.

Has the President an obsession complex?

Whence comes the demand for this legislation? At neither the hearings before the House committee nor the Senate committee did any consumer or any investor, or any citizen other than the Corcorans, the Cohens and the other hirelings of the government, appear in its favor. On the other hand, there has been seemingly a universal voice of protest against it from the companies themselves; from investors; from insurance companies, who are large holders of our securities; from savings banks, and from fair-minded citizens generally. What is it all about?

I will not bring myself to speak in any terms of disrespect of the President of the United States, but I do not think I go too far when I say that he seems to have an obsession on this subject. If I may say so without offense, I think the great mistake of his Administration is trying to combine too much reform, that needs to be carefully digested before enactment, with recovery—the need for which is instant. I make bold to say that this attitude of the Administration with reference to this particular industry is doing more harm to recovery, generally speaking, than all the expenditures of money and other palliatives coming out of Congress are doing good. If the Administration would announce that this kind of thing was to cease, and that government from henceforth would attend to its own proper activities, and give business a chance to come back, recovery would blossom as do the roses at this time of the year. If the government, however, is to persist in its attitude, it is up to the industry to fight for its life. The kid glove stage has passed!

So far as my own company is concerned—which fortunately is rather happily situated, as it is but a single integrated system—I will stand upon the bridge to the end and go down if need be. But our ship will not sink and neither will yours. Justice and truth are upon our side, and the right will prevail. Therefore, be of good cheer!

If Wheeler-Rayburn Bills Pass

What's in store for industrialists, business, public and investors if common sense is not injected into legislation?

By GEORGE M. GADSBY

President
Utah Power & Light Company

THE flow of federal bureaucratic control into the entire electric industry can have but one end—the complete nationalization of electric power. The Wheeler-Rayburn bills are designed to reach the operating company and to incorporate it into a Washington-controlled, socialized power system by seven steps:

1. Breaking down the strength and cohesiveness obtained through the holding company.
2. Weakening the companies in sparsely settled areas by outlawing the service and management company.
3. Drying up the only present source for new money now available to the smaller companies.
4. Precipitating managerial and financial receiverships with S.E.C. thereafter in charge as sole trustee or receiver.
5. Federalizing actual control over operations and of necessity over rates.
6. Reclassifying and reshaping the operating territories, inevitably to the advantage of the tax-built government-operated systems.
7. Enforced incorporation of existing systems into the government-owned national superpower plan.

Section 204 (a) of the Rayburn bill will give the Federal Power Commission a large measure of control over future industrial development in the various areas of the country. In mining, large industrial, and even future agricultural development, power is determinative. It is within the authority conferred by this section for the F.P.C. to go beyond consideration of electric utility affairs and rule upon an application for a transmission line or facility extension. For example, suppose the national planners decide cotton should be processed in Alabama, then there will be approved no more power extensions to supply new spindles in New England, or, again, suppose that viewed internationally they conclude that this country is producing as much copper as it should, then no new lines can be built to develop more copper mines. Thus, a controlling grip is obtained over industrial development, one section against another, or the so-called planned economy against the exercise of the will of a free people.

The principal sources for new money to which we have been accustomed—*i.e.*, institutional investors and direct sales of securities in our local territories — are not now available. The depression, and more lately fear of government competition and legislative destruction, have dried up the new money streams in utility fields, so we can only look to our holding companies for funds to carry us through this period. This last source of capital will be dammed the day the proposed legislation becomes effective.

Faced with the necessity of liquidation, the holding company management must act for that army of investors—great and small—who have put their money into holding company securities. As a result of the new law, funds available will have to be conserved and loans collected. Advances for permanent property can no longer be made. The operating companies will, of necessity, be called upon to meet their obligations to their holding companies. No other private lenders will loan the large amounts currently needed to care for the industrial advance—the first stirrings of which are now becoming so evident. Power is too essential to permit postponement and the demands must be met. The only answer will be the government, and so a socialization of the industry will be under way along still another course.

Socialization by Strangulation

Wheeler-Rayburn Bill's Sole Objective Is to Throw Weakened Operating Companies Into the Hamper of a Huge Bureaucratic Oligarchy

By JACK G. HOLTZCLAW
President
Virginia Electric & Power Company

SINCE a large majority of our operating companies are part of a holding company system, we are vitally interested in both Title I and Title II of the proposed Wheeler-Rayburn act. Title I delegates authority over holding companies to the Securities Exchange Commission and Title II, by amendments to the Federal Water-Power Act, grants to the Federal Power Commission almost unlimited powers over all operating companies. It is very difficult to say which of these two titles affects us as operating companies most, each is so thoroughly a part of the other.

This holding company legislation has not been drawn in such murderous form because of past misdeeds of holding companies, nor because it is seriously thought that they are not economically sound business organizations. These are but smoke screens behind which a far-reaching program of nationalization is being constructed. And since this is the objective, it has been so drawn because these holding companies today are the owners of a substantial majority of the public utility operating companies in the country, and so long as they exist in such capacity it is not simple to break up and acquire the operating groups as easily as is desired by those who sponsor government control and operations.

It is not a question of how much value the holding company is to the operating company from a technical, legal, engineering or other viewpoint. It is not a question of whether financing of the operating companies can be handled by a holding company to a better advantage. It is not a question as to whether or not the combined counsel and advice of those men in the holding company groups are of such benefit to the operating companies as to justify their existence.

Testimony to support all of these points has been ample to justify the holding company in each and every respect, but it seems evident that to a large extent it has fallen upon politically deaf ears—deaf because some do not wish to hear and understand, and deaf because of the knowledge that if heard and understood they cannot help but be inwardly convinced. The plan of those in power is to crack the shell of the nut and destroy it that the kernel might be devoured. From the viewpoint of us operating men, that is the tragedy of Title I.

Title II the Sword of Damocles

You operating men are going to find yourselves answering this question: "Can I, if I have an opportunity, operate my company in the future without my holding company affiliations, as I have operated it in the past?" You will naturally answer this question in the affirmative, because there is nothing else left for you to do, and, if you are so fortunate as to be in charge of a well-organized and financed company, operating in a large, prosperous, stable and reasonably conservative community, I have not the slightest doubt but that you and your board of directors can do a satisfactory job for the public and stockholders just as you have done in the past. Our holding company people lay no claims to being supermen, nor to any particular brand of genius, but they have been responsible, largely by the exercise of foresight, mental acumen and by process of business evolution, in legally bringing together utility properties and groups of properties of every kind and character and legally welding them under centralized control into unified systems.

If you happen to be so *unfortunate* as to be in one of the unprofitable groups and your holding company support is removed, I gravely fear serious consequences for the future. You have been able to keep going through good times and bad, due to the fact that you were a unit of a large group, but now that you find yourself relying on your own resources, you face a situation which is, to some extent, foreign to your past effort and experience, and, in addition you find yourself hopelessly enmeshed in the web of federal domination so carefully provided in the far-reaching provisions of this act.

You will find that the Federal Power Commission has been granted absolute authority to take control of the heart and arteries of your system, your power plants and your transmission lines—all of them—even though you may have only a very small portion of your business in another state. Those who drafted the act apparently felt that all authority needed to accomplish its purpose would simply be that which would direct the Power Commission to tell the operating companies *what* they can do, *how* they can do it and *when* they can do it, in every major phase of the company's operations, so that with such all-embracing authority there can be begun the building of *a mighty nation-wide hook-up*,

in the operation of which the owners will have no voice. It is evident that the primary purpose in the abolition of the holding company lies in the belief that financial embarrassment of the operating units will force them later, in their distress, to seek Governmental aid, and thereupon to become easy prey in the scheme of Socialization.

Just so surely as Title I of this act is designed and destined completely to abolish most holding companies, just so certain will Title II result in the abolition of the operating utility as a privately operated, privately managed institution.

Just picture to yourself several years ahead, when the holding company has been abolished and yours is one of the many operating companies throughout the nation which has been left on its own, to work out its own salvation. What are the major problems that will face you as an operating executive under these new conditions? First, you have your policy of financing; second, the policy of growth and expansion in keeping with increased demands; third, the policy of relationship with your neighboring orphaned utilities, and fourth, the policy of local operation and personnel.

Financing in a straitjacket

In the matter of policy of financing, you will find that the Federal Securities Commission and the Federal Power Commission, as well as your own state commission, must review and pass upon and authorize every piece of financing which is contemplated by your company, either to refund existing indebtedness or to provide for the new money which is constantly necessary in the public utility business. You will find that the federal commissions have authority far greater, I believe, than most state commissions have ever felt it necessary to seek. The federal commissions can completely exercise the function of management in this matter and are authorized to lay down the most drastically prohibitive rules as to the character of your future financing. The decision of the commission as to the necessity of such financing and its purpose is final. You will find that your depreciation reserve, which, in the past has been reinvested in your property, must now be placed in cash in a special investment fund, at interest if possible, and used only for such purposes and under such rules and regulations as the commission may prescribe, and yet, if I recall it correctly, no serious charges of misconduct in financing have yet been aimed at the operating companies under holding company control.

As an operator of an independent utility, you will find, in the matter of judicious expansion of your property, that you are without the power to judge your course and that the prerogative of management has been taken away from you to the extent of having your property and investment used for the benefit of others without your consent. You will find that under H.R. 5243 "no public utility shall undertake the construction or extension of any facilities subject to the jurisdiction of the commission, or acquire or operate any such facilities, or extension thereof, or engage in production or transmission by means of any such new or additional facilities or receive energy from new source, unless and until there shall first have been obtained from the commission a certificate that the present or future public convenience and necessity require or will require such new construction, or operation or additional supply of electric energy."

Further, that it is provided in S.B. 2796 that "the commission is empowered and directed to divide the country into regional districts for the interconnection and co-ordination of electric facilities." In those drastic control provisions is set the trap which, when sprung, makes you simply a unit in a federal system.

Robbed of interchange jurisdiction

You and your board of directors will find that you cannot build or add to a power house or build a transmission line or make a contract with one of your neighbors without the commission's approval, and you will further find that you are face to face with the impossible, in that your lines through "interconnection and co-ordination," or whatever names they may give it, have practically been opened to the public as a means of transportation, upon which a foreign kilowatt has equal rights with your own.

This matter of your managerial policy, which refers to the relationship with your neighboring companies and this buying and selling of power as occasions justify, is of utmost importance in these days in the interest of capital and operating economies and system protection. And yet, you will find that you must go to the federal government, your competitor, and stand by while it passes judgment upon whether or not contracts for additional supply shall be made either to buy from or sell to your neighboring companies any such surplus as each may possess, and it has the power to force interconnections that may be both unwise and unsound.

There is no doubt as to the nature of orders which shall emanate from Washington as to these private contracts for interconnections and power supply. In providing "interconnection and co-ordination," your systems are removed from the jurisdiction of their owners and, though no such intent may be expressed, it is certain that the final outcome of the exercise of this authority will be to make use of the systems of your operating companies to load the gigantic power plants proposed or now being built with government money in the four quarters of the country, and this for the simple, though excellent, reason that there is no market elsewhere for the tremendous amount of power to be generated as a result of these federal flood-control, navigation, soil erosion, reforestation, social betterment, unemployment, experimental yardsticks. Designed as "yardsticks," developed as "whipping-posts" and to culminate as "stocks," in which will be pilloried millions of thrifty Americans, who have, in good faith, used their money and their energy to build this private business.

There will not be much left to the discretion of your management and your board of directors. The experience, skill, knowledge and incentive of private management will have been entirely superseded by bureaucratic order out of Washington, which, unfortunately, cannot possibly have the color of conditions concerning local operations which would make for decisions of wisdom. Is it humanly possible for any group to decide quickly and wisely all cases which will of necessity arise throughout this entire country in this rapidly growing and expanding industry? Is it not true that one of the principal causes of the collapse of some utility holding companies was just this mistake that our government now seeks to duplicate? Can there be any possible result except strangulation of enterprise and stagnation of progress?

Federal Trade Findings

Challenge All Conclusions and Procedure—Propaganda Report Under Pressure—Facts Ignored and Evidence Distorted Purposely

By **BERNARD F. WEADOCK**
Vice-President and Managing Director
Edison Electric Institute

THE Federal Trade Commission investigation is presumed to constitute an indictment of this industry. Let us inquire as to whether such reports constitute a true indictment. The Senate resolution commanded the commission to determine the advantage or disadvantage of the holding company.

Everything that the commission has brought out has been judged by its own standards of ethics, colored at all times by what would make a good news story. Of economic results the commission's final summary has been woefully silent. It has completed its investigation without a true evaluation of the accomplishments of the electric industry and has confined itself to criticisms of little-understood bookkeeping and accounting. It states that it has examined eighteen holding companies, 42 sub-holding companies and 91 operating companies. The companies examined were hand-picked and represent about 41 per cent of the holding companies and 5½ per cent of the operating companies and, in point of output, less than 54 per cent of that of the private companies. Particular companies so selected were generally known to the industry as examples of what a public utility holding company should not be. This is best attested by the great number of them now bivouacked in bankruptcy and receivership. In fact, as soon as the commission heard of any company going into bankruptcy or receivership it hustled its examiners to the scene.

The commission studiously and deliberately, by innuendo, insinuation and positive misstatement, has attempted to create the impression that the abuses and unsound business practices of a few hand-picked and well-publicized companies were typical of the industry. It attempts to apply such abuses and unsound business practices to the other companies examined and to the industry as a whole. These hand-picked companies were used, in

the words of the commission, "as illustrative or typical examples only." Nothing is further from the truth. A fair, honest impartial and economic study of the industry would demonstrate beyond any question that the industry as a whole has functioned well and in the interest of the consumer and the investor.

$30,000,000 "propaganda" item

An illustration of the absolute unfairness of extracting a single excerpt from a document, removed from the context, is clearly shown in the matter of advertising and in charge of the commission that "barring, possibly, government drives during war-time, it is doubtful whether any publicity campaign ever approached this in variety, extent, comprehensiveness, minute thoroughness of planning and execution and the amount of expenditures involved" (Page 60, Vol. 71-A). The accuracy of that charge rests upon the record. The commission, in its effort to substantiate that false statement further, states:

> It is stated that the public utility industry operating under publicly granted franchises (usually exclusive) to serve with light and power expends "$25,000,000 or $30,000,000 a year for public utility advertising * * *."

If instead of inserting the asterisks the commission had inserted the language of the exhibit (being Exhibit No. 185), which was, "gas, electric, street car and telephone companies," and the testimony of the witness, who upon cross-examination by the commission's counsel stated, at page 86, Vol. 1 of Federal Trade Commission Reports, that that amount was a very rough estimate, was not authentic, that only a third of the amount applied to the electric light and power industry, and that it covered the amount of advertising that was done to sell ranges, electrical washing machines, gas service, rates, excursions on street cars, long-distance telephone service, and all that sort of thing, the commission would have brought out the truth. Instead, the commission preferred to select the phrase which would support its sweeping and unfair finding.

Construction Services—The commission has been exceedingly drastic and critical—I might even say violent—in its denunciation of construction and engineering contracts as performed by the holding company. This principal criticism was directed at a company whose basis of charges was as follows:

> 5 per cent of the first $200,000 of construction.
> 4½ per cent of the next $800,000 of such cost.
> 4 per cent of all additional such cost.

It is worthy of note and quite interesting to compare the scale of fees for professional engineering services as officially recommended on federal and federal-aid projects by the American Society of Civil Engineers, which is as follows:

> "Complicated or special projects such as power plants, etc.," the fees range from:
> 8 per cent of net construction cost for projects $200,000, to
> 5 per cent of all projects involving $6,000,000 or more.
> For simple projects the figure of 5½ per cent and 4 per cent respectively.

I leave to an impartial and fair tribunal the reasonableness of the construction company fees.

Service Contracts—The commission requested and the company, at great expense, supplied exhaustive studies upon the benefits of holding company control as reflected in the reduced cost of construction and operation of the operating companies. These facts submitted indicated improvement in service, reduction of rates, construction of efficient plants, the solution of complicated engineering and economic questions, great savings on insurance, taxes and purchases which were passed on to the operating company and reduced the cost of operation. The commission throughout its reports and publicity releases speaks of the money received by the holding companies for such service, but fails to show the value of that service evident to any who might honestly inquire. Only one report considered these economic features and recognized the value thereof and the reasonableness of the charges made therefor.

One conversant with the facts surrounding the operations of the electric light and power companies realizes the advantages and necessity for this type of supervision and the resulting economies, all of which are passed on to the rate payer. That these contracts in and of themselves are not as vicious as the commission would have you believe is best attested by the fact that the following state commissions have exhaustively examined and reported upon the efficiency of these contracts and allowed the charges made as reasonable and fair:

Arizona	Michigan	Oregon
California	Missouri	Pennsylvania
Colorado	Montana	Tennessee
Georgia	New Hampshire	Vermont
Illinois	New York	Virginia
Indiana	North Dakota	West Virginia
Maine	Ohio	Wisconsin
Maryland		

Write-ups—All figures thus far emanating from the Federal Trade Commission relating to write-ups are inaccurate, undependable and unreliable. In its latest propaganda blast, Release No. 264 of May 28, 1935, a further effort to exhibit the shop-worn propaganda on write-ups is made. The latest release is grossly in error in that it describes the amount of the alleged write-up "on a combined basis." This means that write-ups found in either an operating company, a holding company or a sub-holding company are multiplied by reflecting the amount of a claimed write-up in each class of companies, whereas it occurred in but one only. Many of the write-ups were reflected on the books of a single company and not on any other book of account of the group or of the system, and yet in arriving at the fantastic figure the commission quotes, it assumes that it appeared in each of the three companies. If the commission could reduce its alleged write-up figure by 11 per cent between one publicity release on January 10, 1935, and another publicity release on February 5, 1935, it might behoove the commission, in the interest of fairness and honesty, to re-examine its write-up figure before it releases any more false publicity releases. For a full and complete discussion of the unfair and discriminatory method employed by the commission in arriving at its write-up figure, I direct your attention to my article on the subject in the February, 1935, issue of the Edison Electric Institute Bulletin.

Economic basis for holding companies

These illustrations of distorted facts should place one on his inquiry as to the accuracy of the statements of the commission in regard to other subjects mentioned in the report. If you are still skeptical, let me read what the same Federal Trade Commission said of holding companies when it was conducting an economic and not a political investigation, without the flare of rockets or the beat of the drum:

> The fundamental theory of the holding company is that a single large central organization can furnish more efficient and economical management and service in financing, construction and operation * * *.
>
> The pressing need has generally been for capital. * * * The means by which these needs have been met is the holding company. * * * The acquisition by such corporations of the control of operating companies made it possible to consolidate previously independent operating units to obtain the benefits of larger distribution systems necessary to utilize the production of larger generating stations * * *.
>
> The individual operating company, with nothing behind its securities but its own developed or prospective earning power, lacks diversity of resources. When it applies to the investment banker for assistance its security issues are comparatively small and relatively unknown to the investing public. Consequently, it is in a poor position to bargain for loans on favorable terms. The holding company meets this situation by substituting for the securities of its individual operating subsidiaries its own stocks, bonds and debentures, backed by the diversified earnings of its underlying holdings.

A few days before the introduction of the Wheeler-Rayburn bill the commission emitted a report in which it said:

> The choice between suppression and regulation of holding companies will turn logically upon a balancing of their relative advantage and detriment to the general public. If they provide advantages to the public which can be obtained no other way, then it may be desirable to preserve the holding company in order to preserve those advantages to the public. If those advantages can be obtained in some other way, then the argument for retention of the holding company is correspondingly weakened and the decision will turn more largely upon the eradication of evils than upon the preservation of benefits.

And again:

> The one-tier holding company presents many of the same problems as the pyramided holding company system. If suppression be required as a solution, it cannot stop short of suppressing all forms of the evil.

Then it leaves to Congress whether or not suppression or regulation of the holding company is the preferable policy, and says:

> If holding companies are to be permitted to continue to control and manage groups of operating or producing companies, there are four methods which seem especially to commend themselves for the exercise of federal jurisdiction. They are:
>
> (1) The taxation method,
> (2) Direct statutory inhibitions,
> (3) A compulsory federal licensing act,
> (4) A permissive federal incorporation act.
>
> * * * The commission primarily recommends the first two methods; first, taxation, and, second, direct prohibitive legislation.

It may be that the recommendations reflect the speed with which they were made. Pressure—great pressure—was brought to have the final reports ready for this session of Congress.

The President of the United States summarily dismissed a Commissioner whom he considered unsympathetic to the investigation. Repeated demands by Senators and Congressmen to expedite the findings were made to have the report available when the predetermined Wheeler-Rayburn bill was in the process of being drafted. Under this combined pressure the commission has scrupulously avoided any reference to real facts reflecting credit upon the industry and has rendered a report, the gist of which is the strangulation of the industry by excessive, exorbitant, discriminatory and unreasonable taxation, or, in the alternative, abolition.

Statements inconsistent with conclusions

By publicity release No. 264, issued May 28, 1935, on Chapter XI of the final report, which remains unpublished and safeguarded from examination or investigation in the archives of

the commission, another blast of propaganda for the Wheeler-Rayburn bill received wide public notice in the press throughout the country. The commission states that "it appears" that the holding companies performed functions such as the promotion of more rapid extension and improvement of small or undeveloped operating utilities than would have been in many cases possible as independent units; that combinations of smaller utility corporations into one or more larger organizations made possible the advantage of physical interconnection, large-scale production and unified management; that skilled management and expert engineering were concentrated on the problems of construction, production, transmission, distribution and utilization of electric energy; that service was improved and extended, consumption increased and the costs of production were reduced, with a consequent possibility and a tendency toward lower rates notwithstanding accompanying financial practices which had an opposite tendency as to rates.

But characteristic of the reports throughout, it is stated that this was done as a means of increasing the profits of the holding company. It also states that through holding companies the investor could obtain a diversity of risk, yet reap some of the profits of equity investment. This is the limit to which the commission cares to speak well of the industry. for the rest of the release is a condemnation by repeating the singsong of alleged wrongdoings which were contained in the 263 publicity releases preceding this one.

Deliberately malicious

As further proof of the deliberate maliciousness and downright unfairness of this autocratic and bureaucratic body to which the fate of many industries is assigned by its act of creation as to their "fair practices," price-fixing, methods of doing business, I desire to call your attention to an outstanding fact which should condemn the commission in the eyes of the people. In Chapter IV of Volume 72-A of its final report, issued as late as February 2, 1935, the commission enumerated at least twelve advantages of holding companies which are completely ignored and forgotten in its final summary of the advantages and disadvantages of the holding company. They are as follows:

1. "Certain economic needs of small operating companies for financial engineering and managerial service."

2. "Financial function of a holding company is that of temporarily financing the current capital needs of its subsidiaries, pending permanent financing."

3. That holding companies are able to furnish funds for senior security financing where market conditions are unfavorable. This applies especially to "companies whose earning power was weak so that their securities were not in favor with the general investing public."

4. Furnishing of this common stock capital would seem normally to be the function of a local capitalist. But as such capital (local capital) is not always available, the holding company acquired the control of the company and has furnished a large part of the common stock funds. (Common stocks of operating companies in the country represents about $4,000,000,000.)

5. An important process carried on by holding company managements in many cases has been "the enlargement of the operating unit by mergers, consolidations and the physical connections of different properties by transmission lines to such degree as to overcome these disadvantages." (The operating company's difficulties in selling securities at advantageous prices.)

6. Speaking of mergers and consolidations, the commission said: "By this process these operating companies were increased from four small units in 1910 and consolidated into a 192 community unit in 1929, of which 183 were on one continuous electric system."

7. Spreading the irreducible overhead expense of a much larger volume of business and thereby economizing that overhead.

8. The second effect of mergers and consolidations by holding companies has been "that as the size of the unit and volume of business increased and the necessity has arisen from time to time of providing the enlarging unit with additional generating capacity, opportunity has been made to apply on these units progress that had been made in the design of generating equipment, etc."

9. This process accounts for the marked decrease noted by the U. S. Bureau of Census in the number of electric utility establishments. The number decreased from 6,542 in 1917 to 3,429 in 1932.

10. That the application of progress in the design of generating equipment has been made to such an extent in these plants that the station output cost has been greatly reduced.

11. Centralized purchasing for the entire group, with the maximum quantity discounts obtainable for such operating volume under holding company or large operating company contracts with the manufacturers. Where the holding company passes all of these quantity discounts on to the operating company, such centralized purchasing benefits them and potentially the consuming public.

12. Centralization of the placement of insurance and the handling of claims in the hands of a specialist make possible lower premiums and more favorable settlement of damage claims.

Again, in Chapter V of its final report, issued February 5, 1935, at page 74, the commission speaks of the benefits of consolidation and mergers effected by holding companies and enumerates the following benefits:

1. Simplification of its investments.
2. Facilitating of its financing for the increased capital requirements of its companies.
3. Economy of operation in the production and distribution of electrical energy by eliminating duplicate generating and transmission facilities.
4. By scrapping of obsolete facilities, with a consequent saving in capital expenditures; consequent saving in operating costs; greater utilization of waste power and potential power.

Chapter IV of its final report deals with the functions of subholding companies and I have paraphrased five found by the commission:

1. Preserve to the controlling interests some privilege or advantage conferred upon the corporation by state legislature.
2. To meet some provision of a state or national law or the provisions of some contract.
3. In connection with income tax laws.
4. To segregate acquired assets against which there is a purchase money lien.
5. For the purpose of qualifying as full-paid and non-assessible stocks to be issued in connection with the sale of other securities.

Constructive work omitted

One reading the record, the reports and the final reports must be convinced that it was the deliberate purpose to eliminate all comment referring to the constructive work accomplished. This investigation is typical of the exercise of inquisitorial powers of commissions, bureaus and bureaucrats. The Federal Trade Commission is composed of five commissioners, all of whom are men of integrity. I am certain that none of them read the record as made by their subordinates. The final report is made to appear to represent the judgment, opinion and wisdom of the commissioners, whereas, in fact, it was prepared by subordinates in conformity with the bureaucratic practice existing in Washington. It is signed and becomes a public document, when in truth it reflects the prejudiced and biased opinions of subordinates, many of whom have lived the sheltered life of a government employee and are not familiar with the rules and customs of the industrial, commercial or business world.

In the chapter entitled "Conclusions and Recommendations," of its final report, the commission says:

> Nevertheless, the use of words such as fraud, deceit, misrepresentation, dishonesty, breach of trust and oppression are the only suitable terms to apply if one seeks to form an ethical judgment on many practices which have taken sums beyond calculation from the rate paying and investing public.

I am unable to find more suitable words than these—fraud, deceit, misrepresentation, dishonesty, breach of trust and oppression—in characterizing the investigation by and "findings" of the Federal Trade Commission.

Selling in Tennessee

Intensive Selling by 90 per Cent of the Employees of the Tennessee Electric Power Company Brings Astonishing Results —A Matter of Man-Power, Money and Co-operation

By J. C. GUILD, JR.
President
Tennessee Electric Power Company

THE revenue from our residential sales last year was about $2,910,000, or 11 per cent under our peak year 1931. For the first four months of this year our revenue is running at the rate of $3,100,000 per annum. In contrast to this, our residential electric sales in kilowatt-hours for last year increased 33⅓ per cent over 1931.

A very elaborate and rather expensive merchandise sales campaign was set up for the fall of 1933. This campaign was based on the idea of selling electrical merchandise of every kind and description. Its success or failure was to be judged, not by the dollar volume of merchandise sold, nor by the profit made on the merchandise, but by the estimated number of kilowatt-hours the company would sell through the customers' use of the appliances sold. For instance, the sale of a $4 flatiron brought an employee two-and-a-half times the credit of a $125 washing machine.

The first job that had to be done before the campaign started was to enlist the help of every employee from the president of the company down to the negro track men. To secure their interest and co-operation, instead of having employees come in to the various headquarters offices to attend meetings, we arranged for the top executives of the company to circuit-ride the entire property and talk to the employees in relatively small groups at places most convenient to their work. This method of getting our ideas over to every employee was rather strenuous on those of us who went on this barnstorming expedition. It was more convenient, however, for the employees, and was less expensive for the company. Furthermore, the appearance of these executives, drawn from every branch of the business, making talks on merchandise, brought home to the employees the seriousness and importance of the undertaking.

For the campaign we devised a system of commissions, bonuses and most attractive prizes for real sales. On account of the fact that all the employees had had their salaries or wages cut, these commissions and bonuses were doubly attractive. Compensation paid the regular merchandise employees was arranged so that they would not suffer, but rather gain, from the activities of the other employees. A system of co-operation, instead of competition, was provided between employees' selling and regular full-time merchandise salesmen.

However, our sales activities were not limited to the sale of merchandise. In the residence field we employed quite a number of young women to visit the customers' homes and improve the lighting. We also increased the number of lighting salesmen to work on commercial and factory customers. We added to our power sales department. We enlarged our selling force in the commercial cooking, heating and refrigeration field, and also took on men with practical knowledge of air conditioning. To be specific, the sales force was practically doubled in less than twelve months' time.

During the same period we doubled our advertising expenditures, realizing that adequate and intelligently planned publicity was essential. In this advertising program we used practically all of the usual media. In an effort to win a better appreciation for the value of our service, we humanized and dramatized our advertising and publicity by the use of the well-known character of "Reddy Kilowatt," the electrical servant. Reddy appeared in all of our newspaper advertising, on billboards, in window displays and in direct mail pamphlets. We inaugurated a series of playlets over the radio in which Reddy demonstrated the value of good lighting and other services as well as solving electrically most of the problems of the average housewife.

During the eighteen months since the start of this merchandise activity we have sold approximately 12,000 refrigerators, 6,000 ranges and 3,000 water heaters. This means that during this period we have increased the refrigerators and ranges connected to our lines by approximately 50 per cent, and have quadrupled the number of water heaters; so at present, we have a refrigerator for about every two-and-a-half customers, a range for about every five customers and a water heater for every twenty customers. The sales of merchandise in dollar volume have amounted to approximately $25 per residence customer in the last twelve months. The annual use per residence customer on the first of September, 1933, was 594 kw.-hr., and the use on May 1, 1934, was 645 kw.-hr. The use on May 1, 1935, was 840 kw.-hr. This is an increase for the last twelve months of approximately 200 kw.-hr., or a little over 30 per cent. All of this, as I

have said before, in a state which ranks forty-second in spendable income.

The yearly revenue per residence customer on the first of last May was $33.56, and although the use in kilowatt-hours has increased 30 per cent the revenue on a yearly basis is still about 3 per cent less than a year ago. During the last three or four months this revenue has begun to increase and we feel that before very long, if there are no further rate reductions other than those already filed with the commission, our residence revenue will show a gain over the previous year.

In looking over this whole proposition of increasing our sales, you will see that we have used practically every medium of advertising and ordinarily used sales promotional activities, sparing no expense nor effort in building up an efficient, well-rounded advertising department, sales organization and service department, but in addition we have consistently enlisted and used practically all of the employees of the company in this merchandising and load-building program.

The thought that I would like to leave with you is this: In your company your regular selling organization comprises probably 10 per cent of your entire personnel. Make the other 90 per cent sales-minded and load-building-conscious and you will be surprised at the results you will obtain.

Tennessee Electric Power Company Wins Coffin Award

Difficult competitive situation met by novel, concerted sales program, courageously executed.

Entire personnel enlisted in load-building.

New promotional domestic rates carefully explained to employees as well as to the public.

"For Distinguished Contribution to the Development of Electric Light and Power for the Convenience of the Public and the Benefit of the Industry"

Advertising expenditures doubled. Regular sales force doubled. Radio and other publicity used.

Vigorous efforts to increase commercial load.

Dealer co-operation — employees get commissions also if prospects are sold by dealers.

RESULTS: Energy per domestic customer increased 26 per cent during 1934 to 774 kw.-hr. annually. Average rate cut 28 per cent. 12,000 refrigerators, 6,000 ranges, 3,000 water heaters sold in a year among 96,000 customers.

PRESENT SATURATION: A refrigerator for every $2\frac{1}{2}$ domestic customers; a range for every 5; a water heater for every 20.

THE Coffin Award, comprising the Charles A. Coffin gold medal, a certificate and a check for $1,000 to be deposited in the treasury of the utility's employee welfare association, was received by Jo C. Guild, president of the Tennessee Electric Power Company. The judges were Thomas N. McCarter, president of the Edison Electric Institute; Karl Taylor Compton, president of the Massachusetts Institute of Technology, and Frank W. Smith, chairman of the prize awards committee.

Selling in St. Louis

Domestic Load Building by Union Electric Light & Power Company—Results of Sales and Effect Upon Customer Distribution—Co-operation the Key to Success

By C. E. MICHEL
Sales Manager
Union Electric Light & Power Company

IN NOVEMBER, 1933, we organized for the 1934 sales activity. In that month we announced a reduction of $1,300,000 in our rate for domestic service, and after extensive and appropriate publicity on this fact decided that business could best be built by translating the reduction in rate into the low cost of operating appliances in the home, and selected that as the theme around which to build appliance business for every worthy outlet in the district, as well as our own much-needed increase in kilowatt-hour sales.

The first move was the selection of a nationally known advertising council, with whom we worked out the publicity plan. For some time we had been publishing an informative bulletin known as the *Electric News*. Its circulation of approximately 1,000 was among the dealers who were handling, or could handle to advantage, electrical appliances; its purpose was to keep the dealers informed on such things as new developments in appliances, the seasonal movement of the merchandise, the ever-changing customer acceptance and demand, and the resulting opportunities for additional sales. It was decided to use this medium to announce and fully explain the campaigns to follow.

Publicity campaigns included the daily press, radio and billboards. Obviously there was need for supporting material to tie the dealer's store into the campaigns. We produced and furnished the dealers' window display cards, store display cards, appliance cost tags, appropriate folders and booklets on the low cost of operating appliances in St. Louis.

The first radio campaign was built around a half-hour radio show presented at 9 p.m. once each week for thirteen weeks and announced as sponsored by 700 St. Louis electric appliance dealers and contractors. Each dealer was supplied with a book of tickets which, when signed by him,

admitted his family, employees and customers to the studio so that they might enjoy the fun and excitement of watching a big radio show actually go on the air. The attendance at these shows was satisfactory, running as high as 330 in a single evening. After the first thirteen weeks the broadcasting campaign was confined to spot announcements.

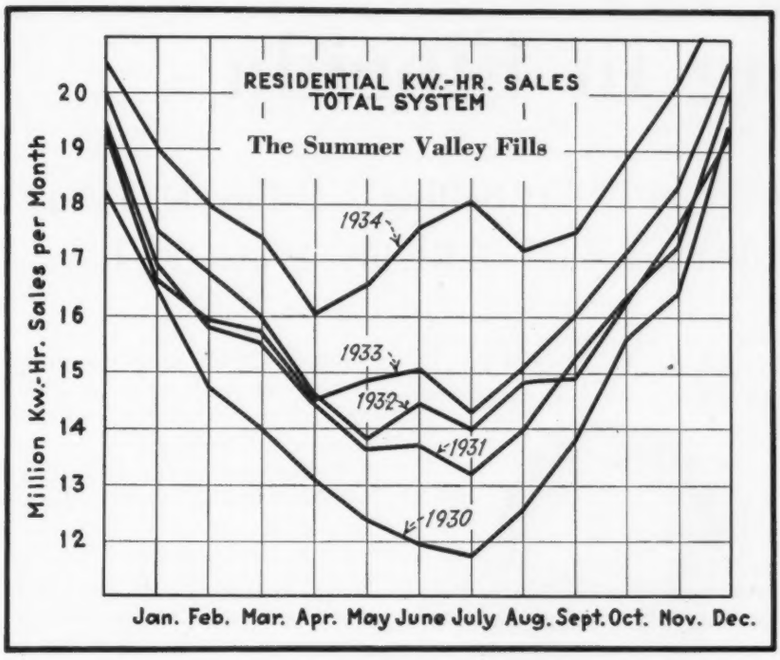
The second move was the employment of a sales promotion manager with broad advertising and promotion experience. His duty was the conception, organization and execution of special activities with the different bureaus. The prime objective of this operation was the bringing of customers into the dealers' stores, and it is interesting to know that on the last refrigeration operation more than 29,000 prospects registered in the dealers' stores for a prize drawing that took place later and necessitated a second visit to the store at the time of the drawing; 16,600 registered under a somewhat similar campaign sponsored by the Electric Cookery Council. All details of these operations were worked out in mass meetings with the distributors and dealers.

The third move was the employment of a merchandising counsellor, a man with years of experience in dealer contact work in the St. Louis area. His prime duty was to be of assistance to the small dealers in solving the problems incident to the transitional stage from passive to aggressive selling.

Then, on November 2, 1933, we called a dinner meeting, at which the dealers in the district were our guests. More than 700 attended and heard the story in detail. Following, dinner meetings were held of related groups, such as the different bureau groups, and to each of these we explained the plans of particular interest to the group; full discussion was had, advice solicited, appropriate changes made and the meetings adjourned only after the group was in substantially unanimous agreement.

There followed two important meetings of the jobbers and their salesmen and this group played a highly important part in such success as attended the 1934 operation, for it was through it we contacted every dealer in the district in his own place of business and sold him directly on the co-operative campaign about to break, his place in the picture, and what he must do in his own store and with his own salesforce in order that he might cash in on the campangn. Subsequently, our own salesmen contacted the dealers, assisted them in dressing their stores and show windows and in making the most effective use of the display material and literature.

We have sold electric ranges in St. Louis for a great many years, as high as 1,600 in a single year, but have reached the conclusion that there will not be a steady sale of this type of merchandise until such time as a substantial retail-distributing organization is built up. Last year we sold but 661 electric ranges. The important point, however, is that 331 of these were sold



by dealers, and that is more electric ranges than all the dealers have sold in St. Louis in the last twenty years. The movement is gaining momentum. In the first five months of 1935 more ranges have been sold than were sold during the entire year of 1934, and 42 dealers have sold approximately one-half of these; our company accounting for the balance.

In the year 1934, 30,166 electric refrigerators were sold in the territory served by my company. We sold but 4 per cent of these and are perfectly satisfied with that volume. The saturation in the territory is now well above 50 per cent.

In 1934 almost as many air-conditioning installations were made in the St. Louis territory as had been made in all previous years, and 70 of these installations were in residences. So far in 1935 we have doubled the number of installations made during the same period of 1934.

Under arrangements with the St. Louis contractors, those contractors who agree to put on a salesman to contact the public in an effort to sell additional wiring are authorized, by proper authority, to pay an hourly wage somewhat under the regular schedule, for additional wiring in the home, and our company finances the wiring for the contractor and bills the customer in twelve monthly installments.

Conclusions

While no detailed figures on the gross increase in the territory on individual items can be given, figures covering our own appliance sales are available. If appliances have been sold in increasing quantities as indicated, then our kilowatt-hour sales to domestic customers should reflect that fact.

The 24,000,000 additional kilowatt-hours at the average net rate earned by our residence customers during the year 1934 produced an additional revenue of approximately $850,000. The actual revenue from these additional kilowatt-hours we know was substantially over $900,000.

The distribution by months of the year 1933 and 1934 of the kilowatt-hours sold to our residence customers is interesting. The 1930 sales follow very closely the hours of darkness, whereas in 1934 the effect of the use of appliances in the homes has bent the load curve until, for instance, in July, 1934, we sold our residence customers better than 18,000,000 kw.-hr.; in the same month of 1930 the sales were just slightly over 11,000,000 kw.-hr. We have taken a big bite out of the summer residential sales valley.

The same information for the years 1930 to 1934, inclusive, is reproduced in order to illustrate the marked improvement that occurred in 1934. It will be seen that the 1934 record is about equal to the sum of the records made during the previous three years.

Discussion of the unprofitable residential customer has occupied our attention for some years. By some it has been stated that a customer using less than 40 kw.-hr. a month should be placed in this class. In an effort to determine the distribution of the additional kilowatt-hours sold by us during the year 1934, we took about a 10 per cent sample of our residential customers to show what happened to this group during the year 1934.

In this sample group 18.1 per cent of the increased use in kilowatt-hours fell under the first block of the rate, which covers the use of 32 kw.-hr. per month; 78 per cent under the second block, which covers the next 168 kw.-hr., and 3.9 per cent under the third block, over 200 kw.-hr.

Further analysis shows that the group of customers using 50 kw.-hr. or less in October, 1933, increased their use by 30.6 per cent in October, 1934, and that this group accounted for 97.5 of the total increase by all customers in the sample group.

Table I — Union Electric Light & Power Company Increase in Appliance Sales

Units Sold 1934 Over 1933

Appliance	Per Cent Increase
Cookers	34.5%
Radiators	99.7
Toasters	59.2
Waffle-Irons	42.6
Portable Lamps	58.8
Washers	39.3
Irons	18.8
Refrigerators	27.3
Disc Stoves	13.3
Percolators	72.5
Food Mixers	35.3
Ironers	57.1
Ranges	80.0

Table II—Increase in Residential Business Year 1934 Over 1933

	Year, 1933	Year, 1934	Increase Number	Increase Per Cent
Average Annual Kw.-Hr Consumption Per Residence Customer				
Metropolitan St. Louis	753.39	823.90	70.51	9.4
Outlying Territory	499.28	548.29	49.01	9.8
Total System	709.45	775.11	65.66	9.3
Increase in Total Residential Kw.-Hr. Sales				
Metropolitan St. Louis	169,267,775	189,529,908	20,262,133	12.0
Outlying Territory	23,450,467	27,127,855	3,677,388	15.7
Total System	192,718,242	216,657,763	23,939,521	12.4
Increase in Residence Customers Served				
Metropolitan St. Louis	228,734	232,451	3,717	1.6
Outlying Territory	48,145	50,547	2,402	5.0
Total System	276,879	282,998	6,119	2.2

Selling in Florida

An Executive Viewpoint on Utility Selling — Principles Used by Florida Power & Light Company — Results Prove the Case

By G. C. ESTILL
President Florida Power & Light Company

ALTHOUGH Florida conditions may be somewhat unusual, yet we believe certain fundamentals must be always kept in mind in order to obtain the maximum in selling utility electric services.

1. Every business, regardless of its type and kind, to be successful, must render the maximum of service or deliver the maximum of merchandise at the minimum cost. At all times we must be alive to opportunities of changing, simplifying and reducing unit electric prices—all for the purpose of inducing more use. I believe greater use of electricity by our customers leads definitely and positively to better public relations and public acceptance of the reasonableness of their electric bills.

2. Large use of electric service is more definitely planted in the minds of our customers today than ever in the history of our industry. This is largely due to the recent large volume of front-page space being given to uses of electricity. Let's capitalize on this.

3. The electric utility is primarily in the business of manufacturing, delivering and selling electricity. In order to bring about the maximum use of electricity there must be close co-operation on a mutual interest basis between the contractors, dealers and the company, and to a great extent, where practical, the contractors and dealers should handle all inside wiring and appliance sales. In your enthusiasm to get appliances connected to your lines, do not sell merchandise at prices and on terms which are so unfavorable to the dealers that they cannot make a legitimate profit. Make available to the dealers the services of your home economists. Make arrangements for the financing of their paper on as good a basis as the company can obtain. Thoroughly advertise such plan and, based on our experience, results will be surprising. Pay your salesmen on the basis of load added rather than merchandise sold. See to it that your dealers and contractors have their say in formulating the dealer-contractor co-ordinating plan.

4. Selling is mainly psychological. The entire company organization must be brought intimately into the sales plan by a system of bonuses for leads on prospects. It is the major duty of the executive, by his actions and word of mouth, to make the entire company organization know definitely that selling activity on the part of the sales organization and the employees in general has his entire and active whole-hearted support and approval.

5. Selling of electric service is not different from selling shoes, dresses, socks or other merchandise. The salesman must sell from the customer's viewpoint. The customer is not interested in how or what comes through the wires to his appliances, but is very much interested in lighting, hot water, cooking, refrigeration and the many other things the service does for his convenience, satisfaction, enjoyment and profit. It is not necessary for the salesman to know anything about the utility business; in fact, it is believed he is a better electric service salesman if he is ignorant regarding utility differences. In the same way, all advertising must mesh with this scheme of things and be written entirely from the customer's viewpoint.

6. You must spend money to secure successful selling results. Man-power is needed, and this entails expense. The amount of money to be spent on selling must be determined entirely by how much new business can be obtained by sales effort. Perhaps an expenditure of 50 cents for each new annual dollar of revenue which can be secured is justifiable, maybe more, who knows?

7. Widespread national use of advertising in itself proves its value to business. We believe, therefore, that we must advertise liberally. If possible, use all media, such as newspapers, radio, billboards, signs, window displays, bill stuffers and direct mail.

8. In your selling see that all phases of the prospective market are being solicited. Our sales program is like a six-ring circus, except that there are ten or more rings and they must all be kept going at the same time.

9. Selection and training of personnel are important. We have found it important that our sales organization be made up generally of young men of the highest intellectual type, well educated and of pleasing personalities. Then we train them by a carefully planned program looking to the development of proper selling technique and personal contact ability.

Our selling in Florida is based on the fundamentals which I have just outlined. Our sales department includes, in addition to the general sales manager, and other supervisory and clerical employees, 27 commercial sales engineers, four lighting specialists, one air-conditioning specialist and one commercial cooking specialist. This makes one commercial sales engineed for every 507 commercial and industrial customers. In the residential section there are 38 residential salesmen, or one for every 1,840 resi-

dential customers, and 20 home economists, or one for every 3,498 residential customers.

In 1934 we had a total of 241 dealers and contractors participating in our co-operative merchandising plan, employing 471 salesmen. Department stores and dealers in our territory sell small appliances on an easy-payment plan. Such appliances as irons and toasters are financed over a period of months. These sales handled by the dealers are running about 6,000 units a month. When this easy-payment plan was inaugurated about 30 per cent of the appliances sold were financed, the remainder of the sales being for cash. This percentage of time-payment sales has constantly decreased, although sales have held their own, until at present less than 10 per cent are required to be financed.

Our company uses newspaper, radio and billboard advertsiing, all of which is devoted to direct sale of electric service. Our advertising department is operated as a branch of the sales department, so that all advertising matter may be directly tied in with sales plans and programs. We spend approximately 1¼ per cent of our gross electric revenue for advertising.

As of February 28, 1935, there were connected to our lines a total of 14,540 electric ranges, or seventeen ranges for every 100 residential customers; 24,093 refrigerators, or 29 refrigerators for every 100 residential customers, and 3,487 water heaters, or ten water heaters for every 100 residential customers. In other words, our range saturation is 17 per cent, refrigeration 29 per cent and water heaters 10 per cent.

During 1934 there were a total of 13,925 major appliances connected to the company's lines through both company and dealer sales, less than 10 per cent of which represented replacements. This total of 13,925 included 2,780 ranges, or 37 for every 1,000 residential customers; 9,566 refrigerators, or 128 for every 1,000 residential customers, and 1,579 water heaters, or 21 water heaters for every 1,000 residential customers. The dealers sold 53 per cent of all the ranges sold, 47 per cent of all the water heaters sold and 94 per cent of all the refrigerators sold. Because of the large number of refrigerators sold by dealers, their sales accounted for 81 per cent of the major appliances connected to our lines during 1934.

For the year 1934 the average use of electricity per residential customer was 797 kw.-hr. at an average rate of 6.80 cents per kilowatt-hour, or $54.20 per residential customer. Using the results of the first four months of 1935 as a basis, and allowing for low summer use, it is indicated that the average use of electricity per residential customer for 1935 will be 950 kw.-hr., compared with 797 for 1934.

In the commercial classification we sold, during 1934, an average of 3,197 kw.-hr. to each commercial customer at an average rate of 6.36 cents per kilowatt-hour, or $203.35 per commercial customer. Using the results of the first four months of 1935 as a basis, and allowing for low summer use, it is indicated that the average use of electricity per commercial customer for the year 1935 will be 4,050 kw.-hr., compared with 3,197 for 1934.

Electric Kitchen—A Load Builder

By P. B. ZIMMERMAN
Head of Appliance Division,
General Electric Company

SIXTY PER CENT of the domestic electrical customers are now receptive to more complete electric service in the home. Promotion of complete electrification has good educational value, but we are not selling anything specific. People do not buy electric current—they buy comfort, convenience and the added time which it affords. Wouldn't the ideal new business venture be one that offers not only a new product—the greatest contribution to the modern home—but with this an outlet which would utilize several times the present output of electrical energy?

What I am proposing is the promotion and sale of complete electric kitchens—tailor-made for each home. Among the advantages of this program to the customer are the following:

The workshop of the home is the kitchen. In the non-electrical kitchen the housewife is expending more hours of manual labor than were permitted under the NRA code for any industry. Assuming that human servants are beyond her means, she can relieve herself of drudgery and enjoy the untiring efforts of electrical servants for only a few cents each day.

The electric kitchen is planned to cut the hours of kitchen labor in half. It is more sanitary. It produces food that tastes better. With its uncontaminated air it is a more healthful work room. It is safe. It protects food in its refrigerator, saves food shrinkage in its range, and reduces dish breakage in its dishwasher.

The electric kitchen, with all its servants, can be operated for approximately $2 a week. It costs as little as a cheap car, and the best kitchen, no more than a good car. It gives the housewife the satisfaction of employing in her workshop equipment as scientifically designed as any in her husband's laboratory or factory. It adds romance to the food service of the home. Its beauty makes it a joy to the family, its attractiveness makes it a center of entertainment—a guest-room.

Among the advantages of the electric kitchen to the utility are these:

1. The customer with a complete tailor-made electric kitchen is the happiest and most satisfied user of electricity.
2. The electric kitchen customer will employ 5,000 kw.-hr. of energy per year, as against the general average of 600.
3. The electric kitchen customer is equal to eight average domestic customers.
4. The electric kitchen with its many appliances gives the most diversified and dramatic demonstration of the flexibility of electric service.
5. The electric kitchen inspires others to a more complete electric service.
6. The electric kitchen is within the means of at least 25 per cent of the electric customers.
7. Thousands of customers who have installed electric kitchens give testimony to the value of a completely equipped and well-planned kitchen. Many thousands of others are receptive to this new labor-saving service, but must see the complete product and have a demonstration to convince them that it will fit their needs.

We are too prone to sell our appliances as merely utility articles, and not give ourselves the opportunity to enjoy the benefit of a greater public interest generated by the colorful ensemble of the electric kitchen.

If we endeavored to describe for ourselves the ideal type of new business, wouldn't we specify an increased load and increased customer satisfaction? The electric kitchen produces both. Wouldn't we want a new load that could be utilized by a large percentage of the customers? Every worth-while home can some day afford the electric kitchen. Wouldn't we want a new load great enough to justify constantly lowering rates? The electric kitchen uses eight times the service of the average energy used by a household consumer. Wouldn't we want a new load that could be easily financed by the customer? The complete electric kitchen can be financed through local banks on a guaranteed F.H.A. plan, and at most attractive rates and terms.

Millions in Subsidized Plants

Duplicating Established Generating Facilities and Confiscating Markets Created by Private Enterprise Is Plain Piracy

By H. W. FULLER

Vice-President Engineering and Construction Byllesby Engineering & Management Corp.

SUBSIDIZED electric plants receive, in one form or another, benefits which other plants of the same character do not receive. Direct subsidies take the form of loans and grants by the federal government. The loans always carry a low interest rate. The grants are an outright contribution and may or may not be given in connection with a loan. Indirect subsidies are often not discernible without special study. All state, county and municipal plants are benefited by such subsidies in varying degrees. These subsidies are:

1. Low rate of interest by pledged credit.
2. Municipality can secure working capital from its current revenues from other sources.
3. Freedom from restrictions on location, construction and quality of service.
4. Payrolls may include only the names and wages of those engaged in the direct manual operation.
5. Accounting systems employed are frequently incomplete and inaccurate.
6. Present taxes on commercial utilities are about 15 per cent of their gross earnings, as against 3 per cent for political utilities.

The total benefits that are conferred on municipally owned and operated plants from the six kinds of indirect subsidies mentioned have been estimated and are shown in the accompanying table.

Despite the many advantages under which they operate, municipal plants have shown a noteworthy decrease in number, especially in the ranks of those which elected to generate their own current. The impetus given municipal plants by the attitude of the present federal administration and the loans and grants by the P.W.A. from the $3,300,000,000 fund will, however, not materially add to the number of municipal plants.

The first P.W.A. report, February 15, 1934, showed allotments for and to 335 non-federal political plants. The second P.W.A. report of November 1, 1934, reducing these allotments to 93, is now out-dated. A third report from the P.W.A. on the distribution of the $3,300,000,000 fund, as of April 20, 1935, shows that the decrease from 335 to 99, was due to:

(a) Unwillingness of municipal authorities to accept terms and conditions imposed by P.W.A.

(b) Adverse results of elections required for approval of bond issues.

(c) Opposition of privately owned utilities whose market would be confiscated.

But 99 municipal, county, power district and state electric plants, additions or improvements have actually been financed by P.W.A. funds, and only 43 of these will compete with established private companies. The total of the loans and grants to 97 of these 99 projects is $26,426,596.

Two outstanding projects are in Nebraska. They received a handsome allotment of $14,300,000. The Loup River project—strictly a power development—has been examined by commercial companies a number of times during a long period of years and always has been turned down. Along comes the government and makes a liberal grant and loans the balance at a low rate of interest, although there is no reasonable assurance that a market will be found for any considerable part of the prospective output of energy. The sales in this area during 1934 are reported as 464,180,000 kw.-hr. and 1935 sales, estimated, will show a 4 per cent increase. This development, when completed, could supply almost one-third of the market.

The second Nebraska project—known as the Sutherland project—irrigation and power, is even less defensible economically than the Loup River project just mentioned. The electric "pickings" in the central part of Nebraska are pretty thin and this plant, when completed, will be able to support about five times the present demand for electrical energy within a radius of 75 miles. These projects bring the total allotment to $39,864,596 on 99 non-federal electric projects.

Since July 1, 1933, about $765,000,000 has been allotted by the P.W.A. to further non-federal projects (exclusive of railroads) and some $260,000,000 of this sum represents grants or gifts to over 4,000 projects.

The new program of non-federal construction has fixed $900,000,000 (without any restrictions as to amount of grants) as the limit—20 per cent more than the first program—and the executive committee of the "Construction League of America" has recommended to the Administration that it adopt the following schedule of diminishing grants for the allotments under this fund:

Fifty per cent grant to projects when work thereon is undertaken prior to December 31, 1935; 30 per cent when work is undertaken prior to December 31, 1936; 20 per cent thereafter.

If this recommendation is adopted the result should not be so bad, for the construction of but few of the projects will be under way by the end of this year. The Administrator of the P.W.A. has apparently broader ideas, for some weeks ago he said that he would recommend a new loan and grant policy of "50 per cent grant and 50 per cent loan" with interest on the loan of 3.7 per cent in place of the 4 per cent effective in the past.

A recent newspaper article states:

> President Roosevelt boosted the outright grant maximum to 45 per cent of the cost of a project and reduced to 3 per cent the interest to be paid on the additional 55 per cent loan.

Should either one of these announced policies as to grants and the rate of interest on loans become effective it will be impossible for a commercial electric company to compete with non-federal electric plants receiving such a subsidy.

The constitutionality of a loan and grant of federal funds to a municipality has been put squarely up to a district court of the United States. The opinion of the Supreme Court in the Schechter case, pronounced on May 27, 1935, was that Section 3 of the National Industrial Recovery Act is unconstitutional. Loans and grants for non-federal works are made under the provisions of Section 203 of the same act. The language of this section is open to the same objection as that of Section 3 in that it is a "virtually unfettered" grant of authority. Section 203 is open to the further objection that these loans and gifts are not in furtherance of the enumerated constitutional powers of the United States and are, therefore, illegal.

We have good ground for hoping that this high-handed method of attacking our business will be prohibited by the Supreme Court.

Subsidized federal projects

There are five major subsidized federal electric projects now in progress: Boulder Dam (Colorado River); Tennessee River; Columbia River; Casper-Alcova (Seminoe); Fort Peck (Missouri River).

Boulder Dam, which will be ready to turn out power one year from now, is a serious problem to those commercial companies and municipalities who contracted for a large part of the electric output. Sixty-four per cent of the estimated ultimate 4⅓ billion kilowatt-hours of firm power per annum was contracted for by municipalities, commercial companies and one "water district," all in southeastern California. The balance (36 per cent) is under option to, but not contracted for, by the states of Arizona and Nevada. All allottees in California for this power, except three municipalities now petitioning for delays, take this firm power on a percentage basis, increasing each year until the end of the sixth year following the first generation of power. It is probable that Los Angeles will seek an adjustment of deliveries because of the depression.

The most publicized federal development is that of the Tennessee River, known with all its ramifications and side issues, as the T.V.A. One federal judge—who does not fear the crack of the Administration whip and is not politically interested in the distribution of the $4,000,000,000 fund—has placed a monkey wrench firmly in the gears of the Lilienthal-Morgan machinery. It is to be hoped that other ranking federal judges who will be called to review his action will see the justice of his decision and have the courage to confirm it.

The three developments on the Tennessee River, with their initial installed capacity of 332,000 kw., may be reasonably expected, with a 50 per cent load factor, to produce 1,165,000,000 kw.-hr. If the T.V.A. elects to increase the installation of generating units at Wheeler Dam to 128,000 kw., then the Tennessee River developments may be expected to generate annually energy which can supply 1,500,000,000 kw.-hr. to ultimate consumers, or 60 per cent of the 1935 requirement, with Pickwick (just started) to be heard from.

The Columbia River offers ultimate power possibilities of 8,000,000 kw. and an annual output of 41,000,000,000 kw.-hr. The territory which can be served includes all the state of Washington, about 40 per cent of Oregon (northern part), a part of northerly Idaho and just a very small bit of Montana—in all some 114,000 square miles. We know that the 1934 kilowatt-hour sales in all communities in this area totaled about 2,420,400,000, and that 1935 sales are estimated at 2,500,000,000. Compounding this percentage of increase each year until Bonneville is ready for service gives a possible annual sale at that time of 2,650,000,000 kw.-hr.

Casper-Alcova-Seminoe is located in a desolate part of Wyoming. A dispute as to water rights has put a stop to the work and may kill the project. This small plant would generate more energy than is now required within a 75-mile radius.

Fort Peck (in northeastern Montana) is mentioned because it has been said that a hydro-electric plant of 50,000-kw. capacity will be installed later; $80,000,000 has been allotted for the Fort Peck reservoir, and the engineers say $100,000,000 will be needed. There is practically no market for power in the vicinity of the dam and the thinly populated territory is now served by a utility.

The Passamaquoddy project as now modified—to secure an allotment of $30,000,000 from the P.W.A.—is confined entirely to American waters and the estimated output therefrom has been reduced to one-tenth (250,000,000 kw.-hr.) of the output figured for the original scheme, with a peak capacity of 45,000 kw. The cost of energy at the switchboard will undoubtedly be high and the distance from the existing market is considerable. Previously named subsidized federal projects are bad, but this one is the last word.

The New Deal policy of duplicating our established facilities and confiscating the markets created by our enterprise and our capital is, in plain words, piracy.

Comparative Financial Advantages of Municipal Over Commercial Electric Plant

	Electric Plant	
	Municipal	Commercial
Cost of plant	$3,000,000	$3,000,000
Working capital	50,000	80,000
Total dollars required	$3,050,000	$3,080,000
Gross annual revenue	600,000	600,000
Est. at 20 per cent of cost of plant		
Operating expenses (35 per cent) (of gross)	210,000	210,000
Excl. of depreciation and taxes		
Depreciation:		
Municipal plant	75,000	
Commercial plant		75,000
Taxes:		
Municipal 2½ per cent	15,000	
Commercial 15 per cent (1935)		90,000
Total operating expenses	$ 300,000	$ 375,000
Net earnings	300,000	225,000
Interest on money:		
Municipal 4 per cent	122,000	
Commercial 6½ per cent		195,000
Balance	$ 178,000	$ 30,000

Rate Making by T.V.A.

Honeymoon Days Produce Glowing Figures — Facts Versus Fancy in Costs and Rates — A Challenge to the Yardstick Using T.V.A. Data

By EZRA B. WHITMAN
Consulting Engineer,
Baltimore, Md.

THE T.V.A., in its rate making, has introduced a number of new and novel ideas, many of which are entirely contrary to decisions by our Federal and Supreme Courts. The first time the T.V.A. rates were challenged was in the case before the Tennessee Public Service Commission at Nashville last October. In this case the Tennessee Valley Authority submitted a one-page exhibit showing its method of arriving at its announced rates where domestic consumers were to be charged 3 cents for the first 50 kw.-hr., 2 cents for the next 150 kw.-hr., 1 cent for the next 200 and all over 400 kw.-hr. at 4 mills.

In the Tennessee Valley Authority release of September 14, 1933, when the rates were announced, the statement was made that the rates had been formulated after weeks of careful study, and on September 15, it was further announced that the rates "are based on the board's policy that Muscle Shoals shall be entirely self-supporting and bankable; in other words, a business enterprise. The computations are based on the best available data and weeks of close study and analysis, and have been subjected to the criticism of recognized rate experts. The figures show that all costs of service are included and, in addition, provision has been made for items of cost not actually incurred, such as taxes and interest, but which were nevertheless included in order to make fair comparison with privately operated utilities for yardstick purposes."

Now let us see just how these yardstick rates were made. In the case before the Tennessee Public Service Commission Table I was presented in evidence as the justification of the rates previously given.

In the case before the Alabama Public Service Commission the basis for

the rates was entirely changed and Table II was given by Llewellyn Evans, chief electrical engineer of T.V.A., as the basis for its rates.

If the computations at Madison were based upon "weeks of close study and analysis . . . subjected to the criticism of recognized rate experts" and caused the authority to conclude that $22.50 per horsepower per year was a fair, reasonable and "strikingly low" rate, it is difficult to see the justification for the Tupelo rate, which is lower by from 23 to 53 per cent.

The municipalities could not buy power at $22.50 per horsepower-year and resell it, without substantial losses, at the low domestic and other rates prescribed by T.V.A. If municipal ownership could not succeed—if the "yardstick" for domestic rates could not be proved—something had to be done about it. So the power rate to municipalities was slashed. To be sure that it would be low enough to permit the municipalities to substitute electricity for coal for house heating, the Tupelo rate disregards entirely the winter demands for heating, fixes only 60 per cent of the previous twelve months' high demand as a basis for minimum payment and extends the interval for measuring the demand from 30 to 60 minutes.

To return to the basis given out for rates-making purposes in both the Tennessee case and the Alabama case, I will take up the different items presented by T.V.A.

1. Valuation

(a) *The Wilson Dam Hydro Plant*—The Wilson Dam power plant was valued in the Tennessee case by the T.V.A. at $24,375,000. In the Alabama case this was reduced to $19,328,806. The actual cost of the Wilson Dam power plant as given by the T.V.A. in the Alabama case was $46,950,748. In arriving at the value of $24,375,000 in the Tennessee case, the T.V.A. said that the installed capacity was 195,000 kw. (The actual installed capacity was really 184,000 kw.) They placed a value, pulled out of the air, of $125.00 per kilowatt of installed capacity.

In the Alabama case an entirely new valuation of Wilson Dam and power house of $19,528,806, was reached. The total cost of the dam, as already stated, was $46,950,748. In the Alabama case $14,273,444 was allocated to national defense, $13,148,498 was allocated to navigation.

(b) *Nitrate Plant No. 2—Steam Plant*—The steam plant at Nitrate Plant No. 2, for the generation of electric power, was constructed during the war at a cost of $12,326,392. It is a 60,000-kw. plant, comprised of three separate machines of equal capacity, one of them a high-pressure machine and two of them low-pres-

sure turbines. In the Tennessee case, the T.V.A. engineers valued this plant at $4,800,000. In the Alabama case they valued it at $1,920,000. They did not attempt to obtain a reproduction cost new of this plant, but substituted a modern steam turbine plant which they claimed could be built for $80 a kilowatt of installed capacity.

All the court decisions of which I know prohibit the valuing of a substitute plant or equipment for that actually used and useful in the public service. Should a company attempt to value a substitute plant at a higher price than the one that was being valued, we all know what would happen to such a valuation, yet the T.V.A. engineers did not hesitate to substitute a modern up-to-date plant of equal capacity, as far as the machinery was concerned, for an entirely different plant and one that would have cost to reproduce a great deal more than such substitute plant.

(c) *Other Buildings, Fixtures and Grounds*—In the Tennessee case the

Table I—Preliminary Cost Computations (Intra-Departmental)

1. Valuation:		
(a) Wilson Dam power plant		$24,375,000
(b) Nitrate Plant No. 2 steam plant		4,800,000
(c) Other buildings, fixtures and grounds		500,000
		$29,675,000
Say $30,000,000		
2. Fixed Charges:		
(a) Interest at 3½%		$ 1,050,000
(b) Res. for taxes (Retirement of capital)		233,000
(c) Depreciation		200,000
(d) Gross earnings state taxes		150,000
		$ 1,633,000
3. Other Charges:		
(a) Operation and maintenance—hydro	$	150,000
(b) Overhead—inc. new business		100,000
(c) Steam plant, added expense running		100,000
(d) Total generation cost	$	1,983,000
(e) Say $2,000,000		
(f) or 2.67 miles per kw-hr. at average of 750,000,000 kw.-hr. per year at busbar		
(g) Nitrate plant — 320,000,000 at 0.1 cent		
(h) $1,700,000 for firm power output of		
(i) 430,000,000 or 3.95 mills per kw.-hr.		
4. Transmission:		
(a) $50 per kilowatt		
(b) Interest and redemption		4.3%
(c) Depreciation		3.5%
		7.8%
(d) Or $3.90 per kw. per year		
(e) Operation and maintenance	$	100,000
(f) On 150,000,000 kw.-hr.		0.67 mills
(g) or 2.68 per kw. per year		
(h) $6.58 per kw. Total—based on 4,000 hrs.		
(i) Plant cost $8.70 per kw. (based on 195,000 kw.)		
(j) Transmission $6.60		
(k) $15.30 per kw.		
(l) Based on 100,000 kw.:		
(m) Transmission $ 6.60	(based on 100,000 kw.)	
(n) Generation 17.00		
(o) $23.60 per kw. year		

Table II—Statement of Expenses and Income Wilson Dam Power Properties

I. Valuation:		
A. Wilson Dam Hydro Power Plant: Rating 184,000 kw. at 0.8 power factor. Present turbine capacity, four 30,000-hp. units and four 35,000-hp. units. Total 260,000 hp. Present value is arrived at by allocating to power the full value of the power house section of the dam, including its machinery, and the step-up substation. Likewise to navigation has been allocated the full cost of the lock section of the dam. The spillway section, joining the power house and the locks, and the land for the reservoir is divided equally between power and navigation. The historic cost has been used for all items except the excavation and concrete, where prices based on results at Norris have been applied to the historic quantities. The resulting values have been depreciated in a straight line for seven years out of 50 years of life for permanent structures, and seven years out of 25 years for machinery and superstructures. The resulting present value for Wilson Dam hydro plant.		$19,528,806
B. Steam Plant at Wilson Dam (Sheffield Steam Plant) Having normal capacity of 60,000 kw., is given a new value by applying a price of $80 a kilowatt new, and to compute the present value it was depreciated for fifteen years out of 25 years expected life, making present value		1,920,000
II. Fixed Charges:		
A. Depreciation or Retirement:		Annual Cost
1. Present value of hydro structures and land $13,069,793 to be retired in 43 years, (sinking fund method at 3¼ per cent itnerest rate 0.010486)		$137,087.00
2. Present value of hydro machinery and superstructures, including step-up transformer station, $6,449,013.00, retired in eighteen years, (sinking fund method at 3¼ per cent interest, rate 0.04082).		263,249.00
3. Present value of steam plant, $1,920,000.00 to be retired in ten years (sinking fund method at 3¼ per cent interest, rate 0.08524)		163,661.00
4. Total depreciation or retirement cost		$563,997.00
B. Interest:		
1. In computing interest, the rate of 3¼ per cent, corresponding to the maximum bond interest rate set out in Section 15 of the Tennessee Valley Authority Act, is used. Wilson Dam hydro power plant, $19,528,806.00 at 3¼ per cent		683,508.00
2. Steam Plant at Wilson Dam, $1,920,000.00 at 3¼ per cent		67,200.00
3. Total interest cost		$750,708.00
C. Tax Equivalent: In setting up a tax equivalent, a rate approximately 12½ per cent of the revenue which would offset the production expense has been applied. The resulting sum to cover all forms of taxes, including the 5 per cent gross earnings tax mentioned in the Tennessee Valley Authority Act. (The tax on transmission lines is included in transmission costs set up below).		$240,000.00
III. Operating Charges:		
A. Operation:		
1. Operation and maintenance of Wilson Dam hydro plant, providing about $70,000, for operating labor, $30,000 for maintenance and $50,000 for supervision and engineering, and general expenses; among which was $24,000 for mosquito control on the reservoir, as shown on the books for the year ending June 30, 1934		$150,000.00
2. For steam plant operation and maintenance, when not running but providing for its operation and maintenance as a stand-by		$ 50,000.00
3. Estimated actual operation three months at $10,000 a month		30,000.00
4. Steam power fuel for the average generation of 30,000,000 kw.-hr. at 0.002 per kw.-hr.		60,000.00
5. Expense for rental of non-operating buildings, fixtures and grounds		10,000.00
6. Total operation expense		$300,000.00
B. General Administrative Expense: Arbitrarily estimated at 15 per cent of the above operating expense		45,000.00
C. New Business and Development Expense: Providing for extensive wholesale promotion, but no retail		60,000.00
IV. Total Cost of Generation		$1,959,705.00
V. Credit for Revenue from the Sale of Secondary Hydro Power: In this statement Wilson hydro plant is conservatively given a firm power rating of 45,000 kw., which, with the 60,000-kw. steam plant, makes a salable firm capacity of 105,000 kw., which will generate with a practical certainty over a period of years 500,000,000 kw.-hr. as firm power, load factor 50 per cent. In addition to which there is over 780,000,000 kw.-hr. of water power which will go down the river and be wasted unless sold at a cheap price. We are estimating that part of this can be sold and credited the cost of generation as follows:		
320,000,000 kw.-hr. at $0.001		$320,000.00 (red)
80,000,000 kw.-hr. at $0.0015		120,000.00 (red)
Total credit for Secondary Sales		440,000.00 (red)
VI. Net Cost Generated Power		$1,519,705.00
VII. Transmission Cost: The value of the transmission system, proposed to distribute this power wholesale, consists of the lines and stations already acquired in Mississippi; those proposed to be purchased in North Alabama, together with some 400 miles of new lines and nine new substations, having a present value altogether amounting to $5,000,000.00.		**Annual Cost**
A. Fixed Charges: The fixed charges for the transmission system allowing 3½ per cent interest, 25-year retirement rate of 0.92567, tax equivalent of 1.5 per cent are		$378,350.00
B. Operation and Maintenance of Transmission System		145,000.00
C. Total Annual Transmission Cost		$523,350.00
VIII. Total Cost of Delivered Power		$2,043,055.00
A. Estimated Revenue: Revenue to be derived from the sale of the output of the Wilson properties when loaded to 105,000 kw. is here computed by figuring bills of an assumed list of 57 wholesale customers whose billable demand amounts to a total of 125,000 kw. as follows:		
10 Loads of 300 kw. demand		
20 Loads of 500 kw. demand		
10 Loads of 1,000 kw. demand		
9 Loads of 3,000 kw. demand		
4 Loads of 5,000 kw. demand		
3 Loads of 10,000 kw. demand		
1 Loads of 25,000 kw. demand		
The kilowatt-hours billed monthly and annually together with the revenue monthly and annually, using Tennessee Valley Authority wholesale schedules and a customer load factor of 40 per cent, are as follows:	Monthly	Annually
Average kw.-hr.	30,500,000	438,000,000
Revenue from firm power sales	$208,284.00	$2,499,408.00
The unassigned excess of revenue over the cost of power is		$456,353.00

T.V.A. engineers estimated the value of other buildings, fixtures and grounds used and useful in connection with the hydro plant at Wilson Dam at $500,000. In the Alabama case no value at all was given to this item, although they did put in an item for the expense of rental of non-operating buildings, fixtures and grounds of $10,000, which would be 2 per cent for maintenance, operation, depreciation and interest on the value of these elements as valued by the T.V.A. in the Tennessee case.

2. *Interest Charges*

(a) *Interest*—The T.V.A. announced that they would pay interest in order to make a fair comparison with privately operated utilities for yardstick purposes, but the interest rate which they charged against the greatly depreciated rate base is 3½ per cent. The 1932 United States Department of Commerce census of the Central Electric Lighting and Power Stations gives a rate of interest of 5.3 per cent for privately operated utilities in the United States in connection with their funded debt. The ratio of funded debt to total capitalization of the electric companies is about 50 per cent, so that private companies have had to raise one-half of their capitalization by the sale of preferred and common stock. I do not need to tell you gentlemen that it costs more to finance stock of any kind than it does funded debt and that an average rate of interest of 6 per cent would probably be lower than the actual cost of money which has been raised by private electric utilities in developing their properties.

(b) *Reserve for Taxes (Retirement of Capital)*—Now let us see what T.V.A. rate experts do with regard to their taxes which they charge so as to make a fair yardstick for private utilities. Under the T.V.A. act the government must pay the states 5 per cent of the gross revenues from the sale of electric power by T.V.A. In the first place, in figuring their gross income, the T.V.A. figure an income of $2,500,000 from the sale of firm power. They also figure that current used by their fertilizer plants would be worth $320,000 a year, and in the Alabama case they discovered another customer, undisclosed, from whom they would receive $120,000 a year for the sale of secondary power, making a total value of secondary power generated at Muscle Shoals in the amount of $440,000 a year.

In order to be fair, the T.V.A. states that the taxes during 1932 for privately operated utilities averaged nationally 12½ per cent of the gross receipts of the private utility companies. Therefore, they proposed to make a charge of 12½ per cent of their gross receipts for the sale of firm power, but no charge at all for their receipts from the sale of secondary power. Of this 12½ per cent which they propose to charge into the rates, 5 per cent of it will be actually paid out, but the other 7½ per cent, which is 60 per cent of their taxes, will supposedly be used to retire their capital. If the private utilities could take 60 per cent of the amount which they pay in taxes and use it to retire their capital, they too would soon be able to reduce their rates. Yet there is nothing in the T.V.A. requiring the setting apart of the 7½ per cent for retirement of capital and there is little reason to believe that it will be so used. If it is collected in the rates, it is my belief that it will be used to take care of deficits rather than retire capital.

Another feature of this tax situation is that this 12½ per cent is charged only on the wholesale price of electricity, while, with the private companies, their 12½ per cent during 1932, which was nearer 15 per cent in 1934, is charged not only for wholesale current, but also for retail current. The wholesale price of current is given by the T.V.A. as about 5.7 mills, while the average price of current, both wholesale and retail, by the private utilities is from three to five times this amount.

(c) *Depreciation*—The depreciation charged by the T.V.A. in the Tennessee case was $200,000 a year on a valuation of $30,000,000, or at the rate of about two-thirds of one per cent. In the Alabama case they raised this depreciation to $563,997, which was fairly close to the $607,000 which I figured should be proper.

The T.V.A., however, in figuring their depreciation, have used the sinking fund basis for arriving at this depreciation charge. Had this been used throughout the life of the plant, then no accrued depreciation at all should have been charged against the existing plant. They use the straight line method of depreciation in arriving at present-day value and then, in order to cut down their annual charges, they go to the sinking fund method, and, where the sinking fund method is employed, no state regulatory body charges any accrued depreciation against the original cost of the plant.

3. *Other Charges*

(a) *Operation and Maintenance of a Hydro Plant*—In regard to the operating and maintenance costs of a hydro plant, the T.V.A. made the following announcement: "On these items we have experience data on the Muscle Shoals plant. Economies and improvements will doubtless be made to cut down this figure, but no allowance in such economies has been made in the computations." In another announcement they say that the "average expenditure for the last seven or eight years to January, 1933, was $245,000 annually." After making these announcements as the basis for establishing their rates, in both the Tennessee and the Alabama cases, they then proceed to reduce these costs of maintenance and operation to $150,000 per year and, in the Tennessee case, they give as a reason for this reduction, that the higher figure included substantial amounts charged to capital accounts, such as the complete overhaul of governors and supplying new parts for them, the recoating of the gates at the dam with hermastic enamel, and the expense of the operation of the village. They call these items capital charges, but I know of no private electric company which would charge such items to capital account. In the Alabama case they reduce the actual charges experienced from the $245,000 announced, to $11,415. It was shown that, according to their own figures, this was an error and that the annual cost should have been $232,000.

(b) *Overhead Including New Business*—In the Tennessee case these two items were combined and were given as $100,000. When it is considered that this item must cover all expenses outside of maintenance and operation of the hydro plant, steam plant and transmission lines and that the T.V.A. expects to sell $2,500,000 worth of primary power and $440,000 worth of secondary power, giving a total of practically $3,000,000, all this overhead and new business expense must be done for about 3⅓ per cent of the gross income of the T.V.A.

In the Alabama case they did change these costs by allowing $60,000 for new business and development expense and $45,000 for general administrative expense.

Such costs by private utilities cover commercial, new business, general administrative and other general expenses. They usually amount to from 15 to 20 per cent of the gross income of the private companies. It is possible that T.V.A. might do this work more economically than the private companies, but I do not believe for one minute that they can carry out this work for one-fifth or less than this necessary work costs the private companies.

(c) *Steam Plant, Added Expense Running*—This item, in the Tennessee case, was charged with $100,000 expense. Although the weeks of careful study had reduced this item to $100,000, it was raised in the Alabama case, after being criticized at Nashville, to $150,000, which was quite close to my own estimate as to cost of maintaining and operating when necessary, the steam plant.

After arriving at a total generating cost, in the Tennessee case, of $1,983,000, they then proceeded to use 320,000,000 kw.-hr. of current at the Nitrate Plant, and the cost of generation was credited with one mill per kilowatt-hour, reducing the cost of generation in round figures to $1,700,000. In the Alabama case they not only deducted the $320,000 for power used at the Nitrate Plant, but they added $120,000 for power to be sold to some undisclosed customer, making a total deduction in the cost of generation of $440,000, in the Alabama case, reducing the net cost of generating power to $1,519,705, or for less than 3.5 mills per kilowatt-hour for primary power alone, but for slightly over 1.8 mills per kilowatt-hour if the secondary power is included.

4. *Transmission*

In the Tennessee case the T.V.A. used a price of $50 per kilowatt of transmission network cost and stated that they considered two loops, one of 200 miles in length and one of 100 miles in total length, together with sectionalizing switches. There is no supporting statement as to whether the loops are typical of conditions to be found in the problem of transmission and distribution in the South. Transforming costs are largely a function of capacity; transmission costs vary with the length of the circuits.

In the Alabama case the T.V.A. valued the transmission lines that it was proposed to buy from the Alabama Power Company and the Mississippi Power Company at the low prices which they were offering these companies for these lines, at approximately 50 per cent of their book values. They also estimated a number of miles of proposed new construction with new substations, giving a total cost of existing and proposed transmission lines of five million dollars.

Classes of property typical of transmission networks for utility services include high-voltage lines where power is moved in large quantities at voltages of 110,000 and above; primary substations, together with synchronous condensers where energy is transformed from 110,000 to voltages suitable for high-voltage distribution, of which in the South 22,000 and 44,000 volts are typical; high-voltage distribution system, consisting of pole lines radiating from primary sub-stations, and, finally, customers' substations tapping these distribution circuits where power is transformed.

For the cost of maintenance and operation of this transmission system in the Alabama case the T.V.A. charged $145,000 for the distribution of 438,000,000 kw.-hr., which is equal to about 3⅓ tenths of a mill per kilowatt-hour. Where figures were available from three different companies, I checked the maintenance and operating costs of these companies for the transmission systems and found these figures ran from 0.8 to 1.2 mills per kilowatt-hour. Also, taking the Alabama power system as typical of Southern transmission and from figures secured from the Public Service Commission as to these costs, using the 3½ per cent interest rate, the fixed charges and operating and maintenance costs of the Alabama Power Company for its transmission systems would be $866,000 a year, compared to $523,000 given by T.V.A.

Rural Electrification

Economic Versus Social Values—Limitations Are Many—Illustrative Costs—Co-operate With R.E.A. in Worth-While Projects—False Conception on Service and Construction

By HUDSON W. REED
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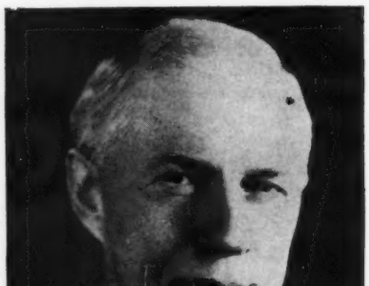


IT CAN be stated without qualification that, considering the low density of rural prospects and their limited buying power, the electric industry has done a magnificent job in attaching three-quarters of a million farm and more than two million non-farm customers to its rural lines. Holding these customers during the present depression is evidence of salesmanship of the highest order. It can further be stated without fear of contradiction that the electric industry has taken more than its share of risks and has incurred more than its share of promotional and operating losses, in an effort to improve living conditions on the farm.

So much for the progress that has been made. We are the first to admit that there is much yet to be done in carrying out the policy of the industry, which may be stated as follows: To aim toward the fullest degree of electrification consistent, first, with the actual savings derivable from electrically performed farm operations, and, second, with the customer's ability to pay for the more convenient but more costly operation of electrical household appliances.

The orderly progress of the industry toward this goal is to be supplemented by the efforts of the national government. The present appropriation of one hundred million dollars is in itself a huge sum. This earmarked allotment can be greatly increased at the will of the Administration. In addition to the amount made available through the relief measure, additional sums required for financing the new customers for wiring and appliances will be advanced by other federal agencies. It will certainly behoove the electric industry to bend every effort to the end that such vast sums are spent not merely for experimentation work or relief, but in a manner that will provide practical and permanent benefits for our rural inhabitants.

There is no question as to the industry co-operating to the fullest extent with the Rural Electrification Administration. Assurance has been given to the Administrator that it will make every possible effort and sacrifice to further this desirable social program. In doing so, however, the industry should know how far it can proceed on its own, or federal capital, consistent with sound business practice. Beyond that point the problem is a social one and must be treated as such.

An analysis of the farm market

Let us analyze our possible market. Farms in this country have a density of 2.06 per mile of road. Eliminating those farms now served, averaging 3.3 per mile, there remains 5,500,000 farms located on 3,000,000 miles of road, a density of 1.8 per mile. With the present low average of farm income, the electrification of all farms, desirable as this may be from a social viewpoint, is clearly an economic impossibility.

Limitations—Here are some further practical limitations to serving any appreciable market:

Forty per cent of all farms are tenant-operated. Even with the lowest reasonable cost of electric service and the most liberal financing on the part of the federal government for wiring and the purchase of appliances, it will be extremely difficult to induce this group to invest its own money for electric service in temporary homes. A much greater demand for wired tenant farms must be created before this condition will materially improve.

Almost 50 per cent of all farms are mortgaged. With farm earnings far below normal, the saddling of an additional debt burden on this group—unless it increases their earning capacity—is impractical at the present time.

The average farm earnings in 1933 were $400; for 1934 they were about about $500. The appliances to be purchased and the extent of their use must be governed by the amount of money available. If, through the use of electricity, farm productivity could be increased enough to offset the investment in the appliances, and their cost of operation, the picture would be different, but, as will be shown, such farms are few in number. Our problem, then, is to:

First—Determine those areas where farm density is great enough to make the construction of new lines feasible, even though not immediately profitable.

Second—Locate such owners as are able to finance the wiring of buildings and the purchase of appliances necessary for full home electrification.

Third—Develop the means of selling electric service to these farm owners, in competition with improved farm machinery, telephones, automobiles and other desirable commodities or services.

Notwithstanding the social value of electric service on every farm, there is no more reason to expect the utilities

to make impracticable line extensions than to expect governmental agencies to extend sewer and water lines into such territories.

To bring together the factor of need for electric service, and the cost of supplying it, we must consider the prospects for its use on the preponderant number of what may be called normal farms, not the few exceptions which use a large amount of energy in farm operations.

The general uses of electricity on the normal farm may be stated as:

First—Lighting for house and other buildings.

Second—Pumping for house and farm operations.

Third—Farm operations.

Fourth—Household appliances.

The most general demand for electricity on the farm is for lighting in the home and other buildings. The hours of use for this purpose are quite few, limiting consumption to 15 or 20 kw.-hr. per month. Pumping water is not essential to every farm, since gravity flow and windmills cut down considerably the number of pumping prospects. The general average for all unserved farms for pumping would probably not exceed 15 kw.-hr. per month. Thus, consumption for lighting and pumping together for all unserved normal farms will not exceed 35 kw.-hr. per month—an insufficient amount to justify general line extensions when unserved farms show a national average of less than two per mile.

There are several types of farms where large quantities of electric energy can be used to advantage in farm operations:

Poultry farms.

Dairy farms, where cooling of milk is necessary for retail sale.

Fruit farms, where pumping for irrigation may be essential.

Truck farms, where pumping for irrigation is sometimes profitable.

These farms comprise less than 10 per cent of all farms, or less than the total farms now served. Thus, on 90 per cent of all farms, electric energy is of little use for farm operations, except for lighting and pumping.

The predominant part of farm labor cannot be performed electrically, because electrical machinery for this purpose is quite limited. The horse and tractor are still the main sources of power, and are likely to retain their position for some time to come. Revenue from farm service must, therefore, be derived primarily from the use of the major household appliances.

Granted that electricity in the farm home has many advantages, it can not, no matter how reasonably priced, compete in cost with such fuels as oil, coal and wood. Moreover, at the outset, its use requires costly new facilities and appliances. Its advantages lie only in labor saving, comfort and sanitation. To secure these conveniences either farm income must be materially increased or other essential comforts of life sacrificed. I do not question the social value of electricity in every house; I only make a statement of fact.

We have, then, a potential use on the average farm little higher than that of a small home in the city, where the density may be more than 100 customers per mile, as against one to four per mile in the rural areas. Consequently, at any rates at all commensurate with the cost of service the electrified farm home will continue to be a luxury.

Costs of rural service

In an effort to minimize this cost feature some proponents of rural electrification make the claim that some type of substandard construction can be used on rural lines which will make their cost only a fraction of the normal distribution line cost. To the extent that there is possible any substantial saving from this source, this claim is fallacious. In rural sections continuity of electric service is vitally necessary. The more extensive the use of electricity on the farm the greater the service requirments. The physical facilites for serving farm customers must, therefore, be of a substantial type if farm electrification is to be further promoted. There is a minimum cost for constructing distribution lines if it is desired to attain the lowest possible over-all cost, coupled with satisfactory service. Below this minimum operating and maintenance costs vary inversely with construction cost.

Despite frequent statements to the contrary, there is no mystery regarding construction cost of rural lines, even though it may vary in different sections and under different conditions, from $600 to $3,000 per mile. Either extreme can be justified.

To go into the various types and costs of constructing rural lines would be an endless task, but the discussion of our problem would not be complete were we to omit an example of the cost of rural service. Let it be understood that there is no such thing as a standard cost for rural lines. The closest we can approach such a condition is by stating what might be termed normal costs. To avoid possible criticism of high costs, we will assume minimum investment and operating costs in our calculations. The figures given should not be construed as standard costs, for any company, but are used only for illustration.

Assuming the cost of money for investment in new facilities at 6, depreciation at 3 and taxes and insurance at 2½ per cent, the total fixed charges on the investment will be 11½ per cent per year.

Assuming an investment of $1,000 per mile of straight line, under normal conditions, and $110 per customer for meter, service and transformer, the total investment per mile, exclusive of any share of the cost of tie or transmission lines, would be $1,330 for three customers per mile. The fixed cost, at 11½ per cent, would be $153.

A conservative estimate for distributing expense would be:

Distribution	$77
Commercial	12
New Business	12
Utilization	6
Administrative	9
Total	$116

Should there be any adverse comment on the cost given for the operation and maintenance of distribution lines, it can be shown that the figures quoted are, if anything, too low. If I had applied the cost factors arrived at by the engineers of the New York Power Authority for urban communities, a cost of approximately $60 would have resulted, instead of $77; whereas the actual cost differential between urban and rural lines is probably nearer 50 per cent than the 30 per cent here used.

Without giving any consideration to load factor or additional substation facilities, tie and transmission lines that may be required, we have assumed as the energy cost at the customer's meter one cent per kilowatt-hour. Applying this unit cost to the present Eastern farm use of 800 kw.-hr. per annum, a total energy cost of $24 results. Again we caution not to use this figure as an actual cost.

Summarizing the total expense involved for three customers per mile of line, we have:

Fixed charges	$153
Cost of distributing	116
Cost of energy	24
	$293
Cost per customer	$97.37

Under no stretch of the imagination is it conceivable that with the present normal farm use east of the Mississippi of less than 800 kw.-hr. yearly can rural lines be made to pay their way at the rates we are expected to offer. Greater consumption is the only answer to a lower unit cost. The great handicap, then, is not so much what can be accomplished through lower construction costs, or rates, as it is the inability of rural inhabitants to purchase the high-consumption appliances necessary to make the extension of lines feasible.

Summarizing the factors which have an important bearing on the estimate of new consumers, we find that:

First—In the most promising sections of the country, the density of new farm prospects is only 2.2 per mile of line.

Second—Most of the farms now served are located in the populous rural sections. This group contains a large portion of dairy, poultry and produce farms, the operation of which will permit the most profitable use of electricity in farm operation.

Third—The large number of nonfarm homes in many instances have made the present lines possible; future extensions must depend more and more on the farm load alone.

Fourth—The cost of wiring and the appliances necessary to make the line feasible would amount to approximately eight times the annual bill for energy, and the cost of service in itself would take a large share of the farmer's cash income.

Fifth—The general belief that farm electric service, like rural telephone service, can be of a substandard type, is fallacious.

Sixth—There is a time element which must be considered in an attempt to change the lifelong habits of any class of people. It required 35 years for electricity to supplant gas for houselighting and fifteen years to connect approximately 11 per cent of our farms to central station service.

There is only one correct way to determine the number of potential farm customers, and that is through the national survey that the industry is having made by those who have lived with the problem for years. Such a national study has never been made. There was, however, a survey made by the industry during the early part of this year in sections containing over a million farms. This survey shed considerable light on the whole subject, particularly on the limitations to the number of prospects, above outlined.

Taking the results of this study and projecting it to cover the entire country, it would indicate that this year lines reaching 200,000 new farm customers could be built, providing it is possible to finance the cost of the lines and the cost of the wiring and appliances on long-term payments, at low interest rates. In addition to the 200,000 farms it should be possible to serve from the same lines 300,000 nonfarm customers. This would be a notable increase to the present number of rural customers, even if a small percentage of those not served. We doubt if the national survey will develop more than the 500,000 customers we have indicated, as the extent of your rural prospects in 1935. This program involves a total expenditure of between three and four hundred million dollars, about equally divided between the facilities furnished by the utilities and those furnished by the consumers.

In pointing out the limitations of the rural load, I do not mean to infer that there is nothing more for the industry to do. Expansion must go on even though this class of service cannot at first pay its fair share of the cost. The electric industry has reached its present enviable position through the pioneering spirit of building ahead of the times. To do otherwise would cause it to stand still—the first indication of retrogression.

If there is to be a more general building of rural lines it must be on the premise that the regulatory agencies understand this social problem so that the return from other classes of service will not be reduced to a point which will hamstring the industry in its pioneering work. Otherwise, our sacrifices will produce few results.

Business in Vapor Lamps

Sodium Lamp Advantageous for Highway Lighting—Industrial and Street Use of New High-Intensity Mercury Lamp—Costs and Efficiencies

By SAMUEL G. HIBBEN
Director of Applied Lighting
Westinghouse Lamp Company

WHEN suitable glass was developed to withstand the etching action of hot sodium vapor the sodium lamp developed rapidly. In its present form it seems best adapted to the multiple and series a.c. circuits for certain types of floodlighting, and essentially for highway lighting. The nearly monochromatic yellow color corresponds with the quality (wavelength) of light to which the human eye is most sensitive.

If the research scientist had set forth to design the lamp of optimum quality for average rural highway lighting service he could scarcely have found a light source more ideally suited for the job. In the two commercial sizes now available, namely, 8,000 and 10,000 lumens, respectively, about 135 watts and 200 watts, it is possible to achieve wholly satisfactory highway illumination on the basis of, roughly, 25 generated lumens per running foot of roadway, or in the case of the 6,000-lumen lamp with about 22 units to the mile.

One estimate of new-business possibilities is based upon the fact that this country annually experiences 11,000 fatal rural highway accidents during the hours of darkness, of which some 5,500 could be avoided with such lighting as outlined, provided it were installed on the most important 20,000 miles of automobile thoroughfares. Perhaps this saving can be translated into more than fifty million dollars—ample to pay almost doubly for all of the lighting costs.

The present cost of sodium lamp equipment may run a little higher than a corresponding wattage of filament lighting installations. Nevertheless, engineers predict longer life and a lessening of equipment cost that inevitably comes with volume production and standardization, to the end that future rural highway lighting business might be predicted to be with sodium lamps, if at all.

The companion vapor illuminant—the high-intensity mercury lamp—differs radically from former mercury vapor tubes, being now commercially rated at easily 35 lumens per watt. So far but one commercial size has been generally used in this country, namely, 400 watts. The deterrents of slow starting and the time delay before reignition in the case of current interruption seem to be outweighed by a relatively high efficiency and a greenish blue quality of the light that is acceptable in many industrial plants.

Being deficient in red, the present mercury lamp has on occasion been combined with about an equal wattage of standard "Mazda" filament lamps and the resultant mixture approaches daylight quality. On the research horizon we glimpse possibilites of mercury amalgams with other metals or of certain gases by means of which the gaps in the spectrum may be partially filled. But withal, the high-intensity mercury lamp seems more applicable as a "worklight" rather than a "selling light" in merchandising establishments, or than a "beauty light" in the residential library. During the past few months of promulgation there have been placed in service approximately 4,000 mercury lamps. Practically all of these are found in the automotive and similar large metal-working industrials.

With any illuminant producing more light for the same power consumption, the sales of lighting power have not decreased, but rather the quantitative standards of illumination have been raised. Practically all mercury-lamp installations made to date have been of high foot-candle intensity. This, then, may suggest the keynote when applying these new sources.

Business possibilities with vapor lamps should not be surveyed without reference to the need of the highest grade of intelligence on the part of the lighting engineer and his familiarity with the comings and shortcomings of these new illuminants. They are not foolproof. They require careful selling and some new technique if their use is to be with utmost satisfaction.

Essential Data on Sodium and Mercury Lamps

Sodium Lamps		
Lamp rating (lumens)	6,000	10,000
Watts (excluding aux. equip't)	135	200
Nominal life (hours)	2,000	2,000
Cathode volts	2.4	2.5
Cathode amperes	10.0	10.0
Lamp arc voltage	24.0	26.0
Lamp arc amperes	5.0	6.6
Mercury Lamps		
Starting volts		220
Arc volts		135 = 160
Watts		400 ± 10%
Lumens per watt		35 ± 10%
Average life, hours		1,500
Average per cent of initial lumens through rated life		80

Recommends Objective Rate

Rate Research Committee Discusses Residential Rates—Use of Rate Form to Increase Revenue and Use Tried Successfully—Low-Use Customer Problem

By FRANK A. NEWTON
Chairman Rate Research Committee, E.E.I.

AT THE close of 1934 there were 20,693,751 homes and farms being served by the electric utilities of the United States. This is a new all-time high in number of domestic customers of electricity. During the year 1934 480,000 domestic customers were added. Domestic sales in 1934 reached a total of 12,797,635,000 kw.-hr. This is also a new high. It exceeds the sales of the year 1933 by 837,379,000 kw.-hr., an increase of 7 per cent. At the same time, while new records were being established with respect to number of domestic customers and total sales to this class of users, a new low was established in the average price for domestic use, namely, a 5.3 cent per kilowatt-hour.

One of the most striking facts of the depression is that the household users of electricity—the homes of the United States—have steadily increased their use of electricity. When this fact is fully realized, in view of what happened with respect to declining purchases of food, clothing and other commodities, it becomes very significant. In the five depression years, 1930 to 1934, inclusive, the purchase of electricity for household use actually increased 31 per cent. The average rate for domestic consumption during the same period decreased 16 per cent. During the same five depression years the users of electricity in this country invested the tremendous sum of $2,667,606,000 in electrical appliances. In 1934 the domestic customers consumed 3,024,847,000 more kilowatt-hours than in 1929 and at an increased cost to them of $59,000,000. Or, to put it in another way, the additional kilowatt-hours used in 1934 by the homes of the United States over 1929 were purchased at an average of less than 2 cents per kilowatt-hour. Is it any wonder that they increased their use of electricity as compared with the marked decrease in their use of other commodities?

The householders of the United States, in the face of steadily decreasing incomes, exercised their choice. They elected to increase their use of electricity while at the same time they were purchasing less of nearly every other service and commodity. Could there be a more significant expression of the public's measure of the value of electricity than this fact discloses? Could there be a clearer demonstration of the promotional character of the rates charged by the companies generally?

The average annual bill paid by the householders of the United States for electricity in 1934 was $33.44. This is $2.79 per month, 64 cents per week and about 9 cents per day. But this is not a complete picture of the situation. These averages, as is often true of averages, are misleading and do not reflect the true situation or indicate the real problem. The Federal Power Commission points out that of the 20,000,000 domestic customers, approximately 13,350,000, or nearly 70 per cent of the total, use only lighting and small appliances. The commission further notes that of these 13,350,000 residential customers, comprising nearly 70 per cent of the whole, 25 per cent used 15 kw.-hr. or less per month, 50 per cent used 25 kw.-hr. or less and 75 per cent used 40 kw.-hr. or less per month. The commission finds that 25 kw.-hr. represents the prevailing monthly consumption of these 70 per cent of the household users of electricity.

Of the 20,000,000 homes using electricity, it is estimated that approximately 1,500,000 are habitual minimum bill customers, paying minimum charges ranging from 50 cents to $1 per month. It is also estimated, on the basis of careful studies, that between 60 and 70 per cent of the residential customers of the country are paying less than $2 per month, or less than 7 cents per day. It seems difficult, in the face of these figures, to understand what all the agitation is about. What is the basis for the attack upon the cost of electricity to the householders of this country, when nearly 70 per cent are paying less than $2 per month, or less than 7 cents per day, for a service which they would be the first to admit is one of the most valuable services they obtain— one of the most reliable, one of the most important in their daily life and one of the greatest factors in household comfort and convenience?

If we understand the views and the aims of the federal administration, its chief concern with respect to residential rates is that the homes of the country may use electricity more freely. As we understand it, the more abundant life includes—and of necessity embraces—a much more liberal use of electricity for lighting, cooking, water heating, refrigeration and all those uses which add to comfort, economy and convenience in the home. This too has been and is the

aim of the industry. It is the reason for promotional rates. It is the reason why your committee, if you please, has asserted and reasserted for years past that promotional rates were a necessity for the continued well-being, prosperity and good public relations of the electric utility industry. We can point with pride to what has been accomplished by the industry, generally, in this respect. Those in the industry who have not adopted promotional rates, who have not made it possible for the residential customers to increase their use at a low price, must see the light and must take steps to correct the situation.

Reductions to small user endanger whole promotional program

There is, however, continual agitation in many localities for the lowering of the rates to the small users. The reason for this is clear. These customers represent nearly 14,000,000 homes, with probably twice that many voters. Every utility operator, every member of the engineering and rate staffs of the commissions of this country, every commissioner and every investigator of residential rates in Washington or elsewhere knows that a very large percentage of these small residential customers are now being served at a loss. This has been demonstrated so many times that it need not be gone into in detail again. Yet, there is a continual drive and agitation by the politicians still further to cut the rates to these small users and thereby still further increase the proportion served at a loss.

Here is a fundamental conflict between the aims of the Administration and the efforts of the politicians. One cannot eat his cake and have it too. The companies cannot suffer continual reductions in revenues—they cannot serve an ever-increasing number at a loss and still be able to make the low promotional rates which are essential to develop successfully the residential business, increase sales, increase volume of output and reduce unit costs. This is self-evident. This fact would seem so clear that there should not be any need of saying anything more about it, but it is the situation we are confronted with. This continual pounding away at the rates to the small users is shortsighted and dangerous. It is effectually slowing up the efforts to promote more liberal use of electricity by low promotional rates. It is defeating the aims of the Administration and of the progressive electric utilities.

In order to accomplish the twofold aim of preserving present revenues, or at least preventing their reduction to a dangerous point, and at the same time offering extremely low rates for liberal use of electricity; there has developed in the past two years the so-called "Objective Rate Plan." The first plan of this nature adopted was the so-called Commonwealth & Southern Objective Rate Plan, made effective by Alabama Power Company in October, 1933. I described this plan in detail a year ago before this institute. It has been described subsequently in various bulletins which are available to the industry. Other plans of the same character have been developed and put in force by a number of companies throughout the country. In Wisconsin the Public Service Commission has ordered all the private and municipal plants of the state to work out and submit some objective plan for the commission's consideration. The Commonwealth & Southern System has demonstrated its faith in its own plan by extending it to other units of its system. The Objective Rate Plan, or whatever you may want to call it and in whatever form it may be adopted, is simple in its purposes. First, it aims to maintain revenues as nearly as may be at their present levels; second, to make available to those customers who wish to increase their use, rates which are decidedly low and decidedly promotional.

Objective rate has demonstrated its efficiency

The two things cannot be accomplished by one rate, in most instances, because the low objective rate which is available for increased use, if adopted as the only rate, would so reduce revenue as to cripple, if not destroy, the company. Therefore, the plan includes two rates, or two features, either an immediate rate and objective rate, applied coincidently, or an immediate rate with free current features added thereto where increased use is made or a discount for additional use. The Objective Rate Plan, we believe, has been subjected to such tests as to demonstrate its practicability, its good effect with respect to public relations and its business-getting power. It has the approval of a number of the state commissions. We strongly recommend its consideration by the industry.

We are too prone to judge the effect of rate revisions entirely by the resulting increases in consumption per customer. The reactions of the customers, the value to merchandising departments in selling more lights and more appliances, these and other things should be taken into consideration in judging the efficiency and success of the plan. It will not be as successful in one locality or company as in another.

The plan, as you know, includes a so-called free-current feature. In some situations, at the particular time the plan is put in force, it may be desirable to offer large amounts of free current for the larger users in order to expedite the sale of the large-current-consuming devices and thereby get the maximum results in the shortest possible time. Again, there may be and there are situations where it is better at the outset to offer more of the free current to the smaller and average customer with the idea that this particular field represents the g r e a t e s t possibilities, particularly where cheap natural gas is available and the sale of electric cooking and water heating in large volume is difficult.

Excise taxes imperil uniform rates

To those who have uniform rates at this time or who may be contemplating the adoption of that system, we direct attention to a development which seriously endangers such a policy. Due to the unfortunate financial conditions in some cities, they have adopted local excise taxes or street rental charges against the electric utilities. In one instance such a tax has been imposed of 15 cents per meter per year. Where uniform rates are in force over a territory comprising a number of cities and towns, it is obviously unfair that those localities which have placed themselves in unfortunate financial conditions should be permitted to compel the taxpayers of other and more efficient and better-managed cities and towns to shoulder some of their deficits. This is what will result if the loading of utilities with local excise and street rental taxes is permitted.

This practice, if not stopped, will ultimately wreck the whole uniform rate ideas. Where such taxes may be successfully placed upon the utility, then the customers in that particular community should be required to carry that particular tax.

Salvaging Capacity

No Power Shortage—How to Add Capacity —Use of High Pressure and Superposition —Modernization on Public Service System

By MARION PENN
General Manager Electric Department, Public Service Electric & Gas Company

UNDER present conditions it is impossible to predict future loads with any degree of certainty, but it is our belief that the rate of load growth for the next few years will not exceed that of the years immediately preceding 1929, when the annual increase of generating capacity was approximately 2,000,000 kw. Under this condition the present surplus of generating capacity will carry us to the 1938 peak. Of course, this applies to the country as a whole. Undoubtedly there are individual systems where capacity will be required earlier, but such situations are well recognized and will be taken care of in the normal way that has always prevailed.

Should, for some unforeseen reason, the rate of load growth exceed that of the pre-depression period, could the industry meet the situation? It unquestionably could, as a large amount of incremental capacity or superposed capacity could be added to existing plants in from twelve to eighteen months and the manufacturers of steam turbines and boilers can produce more than 4,000,000 kw. of generating capacity per year. Also, under such conditions, additions could be made to existing hydro stations if such were warranted.

There are three principal means of adding capacity to existing systems:

(a) By the construction of a new generating station.

(b) By extensions to existing generating stations.

(c) By superposing steam or mercury-vapor equipment on existing turbine generating units.

A fourth method, that of increasing capacity of existing units or replacing them with larger units, is sometimes possible also.

Extensions to existing plants can usually be made at a cost per kilowatt of capacity which is less than that for a new plant. In considering the addition of capacity at the older plants, particularly those in the 200-lb. class, superposing is a practical and economical means of securing new capacity and also makes possible the efficient utilization of the low-pressure equipment.

Superposed installations using high-pressure and high-temperature steam, or mercury units, will usually cost per kilowatt of increased system capacity not more than, and probably less than, the cost of an entirely new generating station with units of comparable size. The proportion of high-pressure capacity which may be superposed upon low-pressure capacity ranges from 60 to 100 per cent, depending upon the high pressure employed and the pressure at which the older plant operates. The amount of capacity which is superposed will depend upon the amount of low-pressure capacity which it is economical to modernize.

The reason older generating equipment is less efficient than the more modern equipment obtainable now is due to several factors:

(a) The steam pressures and temperatures utilized are lower than those used in modern practice.

(b) The boiler equipment of the older plants does not utilize the fuel as efficiently.

(c) The steam cycle is less efficient, the modern turbine installation having steam bled from several points which is used to heat the feedwater.

(d) The turbines are inherently somewhat lower in engine efficiency than modern turbines.

(e) The condensing equipment is of somewhat poorer design.

In superposing high-pressure and high-temperature steam units, or mercury units, on the existing older plants the first two factors causing lower efficiency are largely overcome. Steam boilers for operation at 1,400-lb. pressure and 1,000 deg. F. are available without any change in basic principles of conventional design with natural circulation. Boilers of capacity for 1,200,000 lb. per hour steam flow are in operation and boilers for a flow of 2,000,000 lb. per hour have been projected.

High-pressure exhaust turbine generating units running at 3,600-r.p.m. are available in sizes ranging up to 50,000 kw., the size selected depending upon the capacity of the low-pressure generating units which it is desirable to operate in combination with it. Lower speed machines are available in still larger sizes. The availability of the superposed unit is high because it has practically no auxiliaries.

The other causes of lower efficiency, those resulting from the less efficient cycle and poorer inherent turbine and condenser design, can usually be corrected at a cost of a few dollars per kilowatt. The resultant modified unit will have an efficiency usually not more than 3 per cent lower than a similar machine built today. If we assume that the superposed capacity

is equivalent to 75 per cent of the low-pressure capacity the combination of capacity will be only 1¾ per cent less efficient than an entirely new unit of comparable size.

Usually it is not economical to attempt to modernized existing low-pressure boiler units for efficiency gain alone. Where it is necessary to operate a low-pressure boiler plant and where the installation of high-pressure equipment cannot be justified it may be possible that a study will indicate improvements which can be made. Examples of this are the conversion to pulverized coal or oil firing from other types of firing and the addition of water walls with consequent increase in steaming capacity.

Modernization of Public Service System

At Burlington a superposed unit consisting of a high-pressure boiler and an 18,000 kw. turbine generator, operating in conjunction with three older 200-lb. pressure units, has been installed. It has made available to the system 56,000 kw. of highly efficient capacity and is in line with future extensions providing for the installation of four 100,000-kw. condensing units.

At Essex eight boilers have been equipped for fuel oil firing and for the past two years have carried practically the entire load required of the station. Studies have been made for the installation, when needed, of two 50,000-kw. high-pressure superposed units which will operate in conjunction with an equal amount of existing low-pressure generating capacity. The heat rate of the combination will be about 11,300 B.t.u. per kilowatt-hour. Space for the new boilers and turbine generator units will be provided by the removal of eight of the present stoker-fired boilers.

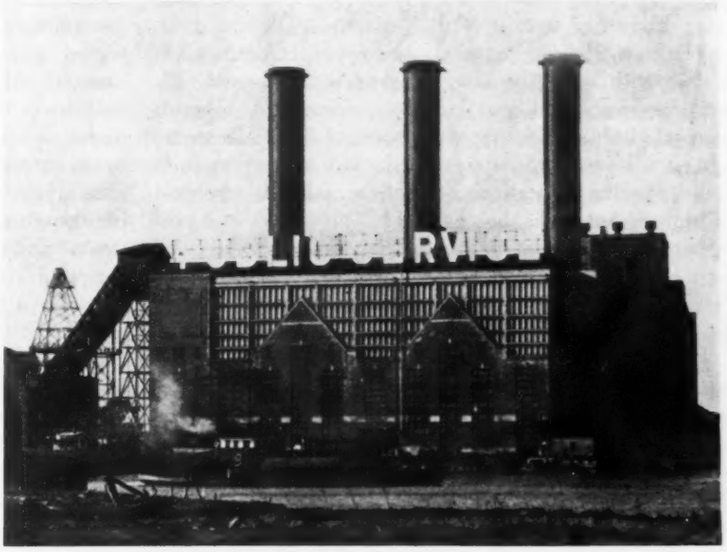
At Kearny there has been installed a 90,000-kw. turbine generator operating at the normal steam conditions of the plant. The steam required by this unit has been provided by the addition of partial water walls and new superheaters to the original twelve boilers. Three large boilers have been equipped and operated with oil firing. A mercury-vapor turbine generating unit of 20,000 kw. capacity has been installed and from a mechanical standpoint has been operating satisfactorily.

The installed generating capacity in utility plants was in December, 1934, 33,242,000 kw. This generating capacity, though 12.5 per cent greater than in 1929, the year having the highest peak load and greatest output, produced 5.7 per cent fewer kilowatt hours of electricity in 1934. A comparison between the heaviest week of 1929 and that of 1934 shows that if the 1934 week's output had been carried with the same operating margin of capacity as in 1929 there would have been 4,800,000 kw. of installed capacity in excess of the load requirements. In other words, at the beginning of 1935 there was a surplus of available capacity awaiting future load growth of nearly 5,000,000 kw.

At Marion, started in 1905, it is planned to install in the future a superposed boiler and turbine generator unit of 50,000 kw. capacity to operate in conjunction with three low-pressure horizontal units. Twenty of the old boilers at this station have been equipped and are operated with fuel oil, and these will be used for peak-load operation of the vertical turbine generators in the station. These thirty-year-old boilers have been operating on oil for three years at efficiencies above 80 per cent.

The Perth Amboy plant, consisting of two 5,000-kw. turbines installed in 1911 and one 10,000-kw. turbine installed in 1918, is used only on peak about two months during the year when load conditions require it. It has not been found possible to discontinue its use, however, as its replacement would cost more in fixed and operating charges than its present operating cost. Due allowance has of course been made for the economical energy which the replacement equipment would carry. We are now making studies of superposing 1,800 to 3,000-lb. pressure steam upon this old equipment and have found that 25,000 kw. of new turbine capacity at 3,000 lb. with a Benson type boiler would carry the entire old plant with a resulting heat rate of 12,300 B.t.u. per kilowatt-hour.

The Public Service generating system today has a total capacity of 685,000 kw. By virtue of load and reserve diversity resulting from interconnections it is possible to carry a load of 675,000 kw. on the generating equipment. The peak load of 1934 was 495,000 kw., leaving a surplus of capacity of 180,000 kw. for load growth. A study of future possibilities shows that 200,000 kw. of superposed capacity and 500,000 kw. of incremental capacity can be added to the system before new stations need be built. These additions, amounting to 700,000 kw., or double the existing capacity, can be made at a cost per kilowatt of 80 to 90 per cent of that for a new plant, and they would entail little additional cost for transmission.



Power Station Modernization

Capacity Can Be Restored to Usefulness by Superposition of Higher Pressures and Temperatures

By A. D. BAILEY
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Commonwealth Edison Company

OLD power station equipment is generally the most economical for peak service for a variety of reasons. The load factor is exceedingly poor and the running hours per year relatively few. The value of this equipment lies largely in its ability to be brought into service quickly either for peak or emergency service. Because of the small amount of output, the fuel and operating costs per kilowatt-hour may be large, but this is of little importance because of the relatively small output, and this cost is invariably only a fraction of the fixed charges which would result from the addition of new equipment sufficient to take care of this short-hour peak load. The old generating equipment which theoretically may have outlived its usefulness is, therefore, economically justified though it may be called upon only for a limited time and for small outputs each year.

In considering the modernization of low pressure plants, the installation of superimposed equipment will be largely determined by the need for additional capacity. It has been quite generally agreed that for relatively large installations the cost of the new high-pressure steam generating equipment and the high pressure turbine, with the improvement of the feed water cycle on the existing equipment and the necessary building changes will cost about the same per unit of capacity as would be the case with a complete new unit of steam generating equipment, turbine, condensers, electric equipment, etc. In small installations the unit cost of superimposed equipment may be higher, but it still may be justified because it improves the efficiency of an equal or greater amount of existing equipment which has already served its theoretical period of usefulness. In spite of its age, the old equipment is restored to its original usefulness and value. In cases where water for condensing purposes is limited, the additional capacity may be obtained without any increase in this requirement.

Most of the older equipment now installed is located near the load or near the center of some distribution system. Switching equipment and the distribution system are already installed and though these may be theoretically near the end of their useful life, their usefulness may likewise be extended by the improvement of generating equipment at existing locations and by increasing the generated output at these points.

Frequently the property area at existing locations is limited and additional land too expensive to obtain. The superposition of high temperature equipment in old stations at such locations, therefore, adds to the use of the available property and increases its capacity for earning.

One of the principal reasons that superposition of high-pressure equipment is so successful is that most of the so-called low-pressure turbines are so well designed that for the steam pressure and temperature range for which they were built very little improvement could be made in a new machine designed and built at the present time. With the addition of steam bleeding and feedwater heating equipment, which can generally be effected at a reasonable cost, the efficiency of this equipment is nearly equal to that of the low pressure section of a modern steam turbine. The improvement in steam generating equipment; that is, boilers, during the past fifteen or twenty years has been very marked, and in addition to the increase in steam pressure and steam temperature which has been made possible by the development of suitable metals, the improvements in design of boilers and firing equipment have resulted in not only a very marked increase in efficiency, but also in the reliability in operation. While we have been arguing for the past few years regarding the continued improvement in reliability of turbines and generators and their auxiliaries (their availabilty factor has passed 90 per cent) improvements in boilers have increased their availability factor to a similar figure. As a result, the large boiler unit has taken its place in station design, and installation and operating expenses have been correspondingly reduced.

The last few years have impressed on the present generation the need for economy, both in capital charges and operating expense. There are literally hundreds of thousands of kilowatts of generating capacity which has already served a useful life, which may be economically restored to its original usefulness by the superposition of higher pressure, higher temperature steam generating equipment. The ratio of the superimposed to the existing equipment will depend on the steam pressures and temperature ranges available, but as the metallurgists make it possible for us to go to higher steam temperatures, higher steam pressures will inevitably follow, which will make the proposition of superimposing high-pressure equipment on existing stations even more attractive than at present and will make present sites and facilities more useful and valuable.

Service to Industrial Customers

By W. E. MITCHELL
Vice-President and General Manager, Georgia Power Company.

I WOULD like to explain how we have met certain service requirements of large industrial power customers. No class of power consumers is in a better position to demand high quality electric service than this. Their loads are usually large enough to justify producing their own power requirements rather than tolerate frequent shutdowns, so they properly insist on a high degree of continuity of service if they purchase power from the electric utility. Just last week one of our customers complained because his plant was shut down 45 minutes while our trouble crew found and replaced a defective primary fuse on his transformer bank. This was one of two interruptions, other than of a momentary nature, this customer had experienced in five years. The other was for 39 minutes in 1933. His complaint was really a reminder not to get careless, and he was fair enough to admit that our service record had really been very good.

If we expect to hold important industrial loads, we must render good service. Even substation and transmission line designs of proven reliability are not always adequate. We have found, in many cases, that furnishing dual service has been of little help. Customers in this class had rather have one or two lengthy interruptions per year than a large number of momentary ones.

As far back as 1928 we began an intensive study of the causes of industrial customers' complaints. We soon discovered that their records showed about ten interruptions to our one. The majority of complaints then weren't based on actual line or station outages. These customers classed everything that interrupted their manufacturing processes as an interruption to electric service. We found 90 per cent of their complaints were based on voltage disturbances and not on actual service interruptions according to our definition of an outage.

The real trouble was in the customer's control apparatus. Practically all motors connected to our system were protected by instantaneous types of undervoltage devices, which would disconnect the motor for even slight voltage surges caused by flashovers, probably many miles away and on some other circuit. This was really a delicate situation. Our design and system planning were O.K., our protective relay schemes were selecting properly, we were having relatively few tripouts on the supply feeders, yet they classed service as "rotten."

We realized it was necessary to sell our customers on the use of time-delay undervoltage protection, unloading devices, etc., in order that their motors would ride over voltage surges of short duration. Numerous tests were conducted to prove to the customers that the idea was practical. Seven years ago time-delay undervoltage protective devices were available for only a few makes of contactors and compensators, therefore we had the further job of getting the manufacturers to build satisfactory devices for all makes of motor starters.

It was a slow process, but we began getting results. Our customers gained confidence in our engineers, and today I am glad to say that between 200,000 and 300,000 hp. of motors on our system are adequately protected with time-delay undervoltage devices which permit them to ride over voltage surges of one or even two seconds duration. This practice of assisting the customers in getting their own equipment in shape has worked wonders in improving our relations with our industrial customers.

In studying the effects of motor speed deceleration on the quality of material produced, we found that at least 98 per cent of industrial loads in Georgia could ride over three seconds of zero voltage without detrimental effects. These tests, backed by the ingenuity of some of our engineers, led to the greatest step toward service improvement during this era; i.e., rapid reclosing of feeder breakers.

The advocates of this practice argued that a half second of zero voltage was no more serious than a half to one second of surge voltage. It sounded reasonable, but how would the breaker stand up under this type of service? Without much encouragement from the designing engineers, or breaker manufacturers, our operating engineers tested the feasibility of this practice, trying it out on a large customer who was securing bids on a turbo-generator because of the importance of continuity of service. The results of this pioneer work are now so well known that I only need say that the customer did not buy the turbo-generator, nor have we lost a single customer in Georgia, due to poor service, since adopting the policy of instantaneous reclosing of feeder breakers.

Through the co-ordinated application of time-delay undervoltage protection to motor control equipment and instantaneous reclosing of feeder breakers we have held and given many of our customers, served from long radial feeders, most satisfactory service, who otherwise would have demanded dual feeds or discontinued our service.

Effect of Service Standards

Reliability in Equipment Increases Costs and Amount of Reserve — Dispatching and Trouble Calls Introduce Trained Men and Increased Costs — High Spots of Modern Service

By N. E. FUNK
Vice-President,
Philadelphia Electric Company

A SYSTEM designed for economic supply of electric service must, of necessity, consider commercially acceptable standards of service characteristics. Standards materially higher than this will increase the cost of service and tend to reduce the use: conversely, materially lower standards, even at equivalently lower costs of service, would prevent use by many otherwise potential customers because of the unsatisfactory performance that would be experienced.

No prescriptions or magic formulas can be laid down to apply universally to all electric service systems, but the major requirements of acceptable service can be defined, and such definitions are used in all well-regulated systems to guide and control design and operation, tempered, of course, by the many and varied local conditions that must be considered if the most economic service is to be supplied to the particular locality.

Service can be supplied over the inanimate facilities of the system only by the operating personnel; thus, the nature and quality of their contact with the consuming public is also a factor in supplying satisfactory service.

Major factors of acceptable service

1. *Continuity*—The cost of power is so small as compared to all other manufacturing costs in most industries that production derangements caused by frequent and long power interruptions would be much more expensive than the cost of the power itself.

2. *Voltage Regulation, Flicker, etc.*—Service voltage must be kept within reasonable limits, otherwise energy consumption devices will give unsatisfactory results. The increased use of appliances in the home necessitates increasing care in distribution design because of the greater and more variable load in each location.

3. *Safety*—The system must be designed to safeguard the customers, the general public and the employees operating the system. This requirement always raises the standards and costs of construction above the minimum that theoretically could be used to supply the ultimate consumer.

4. *Customer Contact*—Arrangements must be so organized that the customer can readily make pleasant and effective contacts with the company.

Effect on system design

1. *Generating Stations*—Electric energy cannot be stored economically, but must be delivered on the instant of demand. This necessitates the installation of additional equipment over and above that necessary actually to supply the load demand.

As an example, the minimum percentage of spare capacity will vary from 100 per cent of the load in a small station with two units of equal size to 20 per cent of the load in a large station with six units of equal size. In the case of large interconnected systems with many stations, the percentage of spare may be as low as 10 to 15 per cent, depending, among other factors, upon the ratio of the size of the largest unit in the combined systems to the combined system load.

The inclusion in the design of the generating station of safeguards to employees working there and the service to the customers necessitates a material increase over the equipment necessary to supply a mediocre service. Provisions must be made to isolate equipment failures quickly and without disturbance to other parts of the station. High-voltage switches and buses must be isolated by separation or inclosure so that faults may not occur between adjacent live parts, and accidental contact can be minimized.

2. *Transmission*—Service could be supplied to the load over one transmission line from a single source of power, in which case, whenever the transmission line was in difficulty, service would be interrupted until such time as the line could be put back into service—a very unacceptable condition to the customer. To safeguard against interruptions from this source the transmission is designed either with structures supporting duplicate lines on one right-of-way or by single lines along separate routes from the same generating station, or from different generating stations to safeguard against simultaneous outage during severe thunderstorms.

Major aerial transmission lines must be designed for severe wind and sleet loadings where these conditions exist. It often has been claimed that there is a great amount of information available on transmission costs, indicating that this cost is more or less standardized. Nothing could be farther from the truth. In locations where severe sleet and wind storms are frequent it is necessary to use materially stronger construction than is required where these conditions do not exist. For this reason transmission line cost for such territory is much more expensive than where these conditions are much less severe or absent entirely.

All too frequently, in discussing transmission costs, the cost of right-of-way is either neglected entirely or given but little consideration. Quite frequently right-of-way is the greatest *single* item of transmission cost.

In spite of all the progress already made toward improving the lightning protection on transmission lines, well over 80 per cent of all aerial transmission line outages are still due to storm troubles.

In case of underground transmission, where it can be economically done, it is desirable to install cables along different duct routes so that a serious disturbance in one duct route will not completely interrupt transmission service. In systems where substations are so located that the minimum cost of transmission dictates the supply from a single generating station, it is in many cases desirable to have spare transmission between this substation and a substation supplied from some other generating source. This is particularly true in large urban centers.

To summarize briefly, the facilities in the transmission system, depending, of course, upon local conditions, include 25 to 100 per cent of spare equipment in addition to the minimum which would be required if our customers would tolerate the inconvenience of the service outages that would accompany the absence of spare capacity.

3. *Substations*—To provide for virtually uninterrupted supply to the load in case of equipment failure requires from 33 per cent (four-bank substation) to 100 per cent (two-bank substation) more investment in transformers than the bare minimum required for supply of the load without regard to service continuity.

Although in some instances high-tension busbars may be avoided without the possible reduction in substation cost being more than offset by the increased cost of transmission facilities which almost always accompanies such arrangements, it is a practical impossibility to avoid low-tension buses in the substations. There are many variations in the design of these buses, ranging from the single bus in the very small substations to two independent buses and possibly sometimes also an auxiliary bus in very important substations and intermediate possibilities of variations in ring bus arrangements, but it would be my estimate that requirements of service continuity increase by 30 to 100 per cent the substation bus and switching facilities needed.

4. *Distribution*—In the skeleton system, the height of poles would be limited only by minimum ground clearance requirements and pole strength would be no more than sufficient for moderate climatic conditions. The necessity of tree trimming and in some cases increased pole height to give adequate clearance where trimming would be ineffective in reducing storm outages are factors which vary widely in different areas and are frequently overlooked.

Continuity and voltage regulation

The load carrying capacity of a primary circuit is determined by either of two major factors—voltage regulation or the current-carrying capacity. Present-day requirements of service continuity in general require extra circuit capacity to provide for the emergency supply of the load in case of circuit trouble. In well-built-up sections this may require as much as 25 per cent minimum spare capacity in the substation circuit sections and feeders, to say nothing of external provisions for circuit breakdown extensions and adequate sectionalizing devices to permit prompt and efficient emergency load transfers. Since the number of circuit outages per circuit year under given conditions is quite definitely related to the miles of primary exposure per circuit, the electric service company frequently encounters the necessity for limiting the amount of such exposure and therefore the area which the circuit can supply, regardless of the load-carrying capacity. This limitation, which must be recognized in order to give acceptable service continuity in most of the suburban and rural areas, often requires as much as 100 per cent more circuit capacity than would be required in a skeleton system where service interruptions or voltage regulation were not sufficiently considered as a factor in design.

Permissible voltage regulation as determined by customers' service requirements is a very important factor in the secondary system. This is because the capacity of the system is almost directly proportional to the permissible voltage regulation. While costs vary greatly at different locations and in different areas it is probably conservative to say that the cost of the secondary system laid out for 5 per cent over-all transformer and secondary voltage regulation will, in general, be approximately 20 per cent greater than if, for instance, 7½ per cent voltage regulation were permissible.

Service continuity becomes a very important factor in congested business areas. Meeting service requirements brings us face to face with the cold fact that underground construction requires from three to five times as much investment as equivalent aerial construction. Furthermore, the spare capacity requirements for low-voltage network service are even more severe than for other methods of supply.

5. *Safety, General*—Under the heading of "Safety to Personnel" may be grouped many such items as ample provision for emergency exits in exposed areas, remote operation of equipment, warning signs, effective blocking procedures, adequate clearances, adequate permanent grounding protection and effective portable grounding facilities to protect workmen in vicinity of blocked-out but normally alive facilities, interlocking where possible to prevent switching errors, a carefully supervised convenient supply of rubber gloves, safety insulating boots and blankets, etc.

6. *Service Buildings*—To reduce the time of service restoration to a minimum, service buildings are located at strategic points in the service territory. This permits comparatively short travel distances to make repairs to equipment which has failed in service, a very necessary feature during severe storms which may strike many widely separated localities in a few minutes.

7. *Customer Contact* — Load and trouble dispatching includes exercising almost complete operating supervision of the entire system, in such a way that the customers' requirements are anticipated and service troubles are promptly corrected. Continuity of service must be preserved, the safety of the operator must be assured, the safety of the workmen must be guaranteed and such economy of operation must be effected as can be attained with the above requirements.

Provisions must be made for all trouble calls to come promptly to the dispatchers who direct the activities of representatives of the service organization located at strategic points throughout the system. In times of severe trouble, virtually the entire company organization is at the disposal of these offices, which must be equipped to handle hundreds of calls an hour.

Building Good Will

Synonymous With Preservation of the Industry — Explode the Yardstick Fallacies — Sell Services and Products — Talk to the Public

By J. F. McLAUGHLIN
President
Puget Sound Power & Light Company

BUILDING good will and preserving our business are one and the same. We are assured of a place in the sun only on the basis of the merits of our performance in discharging to the satisfaction of all concerned the obligations of a public trust. If we fail in this it is inevitable that somebody else will take our place. We don't rule by divine right; we exist because the people will it. Autocrats breed bureaucrats. No business can survive where customers patronize it only because they have to and are not satisfied to do so. The fact that people want to trade with an enterprise gives it good will. The success or failure of a business depends upon good will. Therefore, good will, which is just another name for satisfied customers, is the most valuable asset, the most precious possession a business can have.

It goes without saying that you can't build good will by being a money changer in the temple or a racketeer on the King's Highway; you can't build good will by selling an inferior product or by charging too high a price for good service, and that those businesses classed as public utilities are not entitled to the profits of speculative enterprise. Public interest is paramount; it must take precedence over self-interest whenever there is a conflict. The power industry should be effectively but wisely regulated in the public interest.

Not condoning our misdeeds and with no thought in mind of dodging the just penalties for our own mistakes, it must be concluded that the real root of our trouble is politics. This great industry of ours is imperiled by political caprice and socialistic urge. For the present we are the fall guys—the victims of a most vicious system that demands its pound of flesh in human sacrifice for personal aggrandizement of some politicians. Indiscretion and overindulgence on the part of some in the light and power business may have contributed to our present ills, but it will be just too bad for the American people if politics causes our demise.

The only way we can combat this sort of thing is by going to the people with our story; by having them realize that we are honestly and genuinely working in their best interest; by proving to them that we are not public menaces or malefactors—that we aren't as black as we have been pictured—by convincing them that the light and power companies are doing a constructive job in the public interest—that the good we have done far outweighs our delinquencies. The demagogue makes his constituents believe that he is their benefactor. We, with truth as our weapon, must defend ourselves. We must make it unpopular for the politician to attack us unfairly. We have been a political football long enough. Too many politicians have the idea that the way to public office and personal prestige is through vilification and denunciation of the private utilities. It's up to us to reform where necessary, discontinue such abuses as may exist, conduct our affairs so as not to be vulnerable to attack, and, through the confidence of the people in us, force the politician to obtain his meal ticket elsewhere. We have been feeding the mouth that bites us long enough.

It isn't enough just to peddle kilowatt-hours. Perhaps we ought to talk less about kilowatts and cents and do some real cathedral building—every man's home a castle—every kitchen a woman's paradise—the fully electrified home our dream—the more abundant life our objective. We have put romance into this business—we have blazed the trails—we have pioneered when the risk was great—we have had idealistic conceptions. Let's talk about them, let's move Edison, Steinmetz and Westinghouse to the front pages of the press which the wizards of frenzied finance have monopolized to our detriment.

Notwithstanding new details, raw deals or anything else, we can't escape the fact that our customers judge the company by the meter reader, the cashier, the serviceman and the other employees with whom they come in daily contact. If our employees are not courteous, capable, efficient, sympathetic and understanding public servants, then we can't expect our customers to be for us. We are no stronger than our army and we can't expect to win out without comrades who are imbued with the spirit of our cause—ready to die with their boots on—loyal to the core—well trained and determined that our "light shall never fail" to brighten the hopes and illuminate the pathway to better days for the American people.

The real problem, the big thing right now, is to provide the home with electrical appliances and equipment. To do otherwise is to put the cart before the horse. This is where our customers need help and we can get good will by helping them. Of course rates must be competitive, but by and large it is not the cost of operating appliances which is the stumbling block to increased use of electricity

in the home. Our domestic rate schedules are so designed that a customer automatically gets lower rates for increased use.

We must explode the yardstick fallacies. We know that there is no way the government can establish a fair yardstick to judge the merits of the performance of private enterprise by going into business, because it does so on the basis of self-made advantages. The important thing is to have the man in the street understand this. Behind government in business is government itself—all-powerful and determined that its business ventures shall make a showing. Everybody should know that these so-called public power yardsticks are, after all, candy sticks for the politicians and broomsticks for the utilities.

We are today fighting in the front-line trenches. If we don't win our battle, I'm afraid there will be many more in the trenches, and 'ere long there will be many a white cross piled row on row, marking the sad end of America as we have known and loved it. We are fighting today not only to preserve the invested savings of millions of splendid, thrifty citizens, and for the the right to live on the merits of our performance in the public interest, but for the still bigger thing—the preservation of this country as a land of opportunity, where a free people may benefit from their efforts in proportion to their contribution to the welfare of mankind. Our task is not easy, for, first, we must get the people to accept the truth as the truth when we tell it to them and, secondly, to act intelligently in their own best interests. Unfortunately, it seems to be difficult for folks to learn by the experience of others, and the only way they can be satisfied that fire will burn is to get burned.

E.E.I. PRIZE AWARDS

Presented June 5 by Frank W. Smith, President New York Edison Company, and Chairman of E.E.I. Prize Awards Committee at the Atlantic City Convention This Week

CHARLES A. COFFIN MEDAL to

Tennessee Electric Power Co.
J. C. GUILD, JR., President

. . . "*for distinguished contribution to the development of electric light and power for the convenience of the public and the benefit of the industry.*"

GEORGE A. HUGHES AWARD to

Florida Power & Light Co.
GEORGE ESTILL, President

. . . "*for the greatest contribution to the development of the domestic cookery load.*"

THOMAS W. MARTIN AWARD to

Puget Sound Power & Light Co.
J. F. McLAUGHLIN, President

. . . "*for the greatest contribution to the advancement of rural electrification.*"

H. M. BYLLESBY PRIZES to

R. E. Kerns, Oklahoma Gas & Electric Co.
John H. O'Grady, Chicago District Electric Generating Corp.
Samuel J. Helfman, Philadelphia Company.

. . . "*for the three most meritorious papers showing how to increase the usefulness of the accountant in the electric light and power industry.*"

B. C. FORBES PRIZE to

Robert C. Cleminson, Nebraska Power Co.

. . . "*for the most meritorious paper dealing with the subject of public relations.*"

A. L. LINDEMANN PRIZES to

Mrs. Dera Arrington, Oklahoma Gas & Electric Co.
Misses E. Mae Jones and Anne L. Robertson
both with Virginia Electric & Power Co.

. . . "*for the three most meritorious papers dealing with the advantages of electric cookery for domestic purposes.*"

JAMES H. McGRAW PRIZES to

J. E. Allen and G. J. Gross, Pennsylvania Water & Power Company
(Locating Faults on Overhead Transmission Lines by High Frequency)
George C. Guthrie, Detroit Edison Co.
(Apportionment of Load Among Dissimilar Units)
M. L. Waring, New York Edison Co.
(Stability of Interconnected Systems)

. . . "*for the three most meritorious papers on any engineering or technical subjects relating to the electric light and power industry.*"

EDISON ELECTRIC INSTITUTE MEDALS to

Arthur Faires, Pennsylvania Power & Light Co.
Laffayette G. Nelson, Elk River Power & Light Co.
John G. Christopher, New England Power Engineering & Service Corp.
Mortimer G. Williams, Marlborough Electric Co.
Nahen Jabbour, Fall River Electric Co.
Line Gang (comprising Messrs. Bartling, Quick, Brown, Davis and Hailey), Green Mountain Power Corp.
H. W. Slagle, Pennsylvania Power Co.
Harry A. Glover, Duquesne Light Co.
Edward O'Mara, Philadelphia Electric Co.
Howard S. Leech, Virginia Public Service Co.
Leslie G. Shelton, Texas Electric Service Co.

. . . "*for member company employees who have successfully resuscitated individuals suffering from electric shock by the Schaefer prone-pressure method.*"

Manufacturers Delighted

A LARGE number of electrical manufacturers attended the Edison Electric Institute meeting. They were encouraged by the spirit prevailing and paid many compliments on the large attendance and the fine program. As usual they and their wives enjoyed the social atmosphere as well as the business meetings.

This was a splendid meeting. It gave evidence of a fine spirit and renewed confidence in the utility industry that promises well for the future.

H. VAN ERBEN,
General Electric Company

A. W. ROBERTSON,
Westinghouse Company

The public utilities have done a fine selling job during the past three years. The next big load-building factor will be the air-conditioning field, which will carry with it an increased demand for generating and distributing equipment. This will help the capital goods industry. When capital goods are moving we will have a definite return to prosperous times.

R. T. STAFFORD,
Allis-Chalmers Company

This was a fine convention and I was agreeably surprised at the large attendance and the quality of the program. It is apparent that the utilities plan to build load and to go forward. This is encouraging to all of us.

C. R. HORRELL,
Sangamo Electric Co.

I was impressed with the quality of the meeting. There was a good representation from all sections and the program was informative and stimulating.

JAMES R. KEARNEY,
James R. Kearney Corp.

A very encouraging convention. There was a different atmosphere prevailing. I liked the program and look for the utilities to go forward.

J. S. LAPP,
Lapp Insulator Corp.

A fine meeting. It gave great promise of better business in the future.

H. W. YOUNG,
Delta Star Company

With the E.E.I. Meeting

WE TOOK some pictures of these gentlemen and drew out some very favorable comments from them as to their reaction to the meeting. The close union of all branches of the industry in common objectives was never better illustrated than in the attendance at Atlantic City.

C. W. APPLETON,
General Electric Company

One of the best meetings I have attended. The addresses presented were unusually good and the spirit of confidence exhibited was unmistakable.

W. H. TAUBERT,
Corning Glass Works

I liked the attitude shown and the program presented. The utilities are going forward. They showed a courage and a spirit that will bring worth-while results.

W. K. VANDERPOEL,
Okonite Company

This has been a splendid meeting. There was a good attendance, a fine spirit and attitude, and a good program.

J. J. MULLEN,
Moloney Electric Co.

An aggressive sales program should be the order of the day in the utility industry. Nothing would be more effective in building up public good will and, by tying in this sales program with the federal government's various emergency appropriations, we can be of public service by thus helping to minimize the ultimate burden on the taxpayer by putting these public funds to a truly economic use.

MORSE DELL PLAIN,
American Street Illuminating Co.

There was a fine spirit and attitude of confidence at the meeting. The reports of sales work and the plans for load building promise to bring about better business for all of us.

RALPH KELLY,
Westinghouse Company

It is like old times to find a large attendance and good spirits at the meeting. The program was splendid and the outlook for better times is quite promising.

M. M. KENNEALLY,
Ohio Brass Company

ELECTRICAL WORLD

L. W. W. MORROW · EDITOR

PUBLISHED EVERY OTHER SATURDAY BY McGRAW-HILL PUBLISHING COMPANY, INC.

VOLUME 105 ESTABLISHED 1874 NUMBER 12

JUNE 8, 1935

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Utilities Will Co-operate in Rural Electrification

SEEK the farmer who is anywhere near an electric system and has a dollar to spend for wiring and appliances. You will find that he either has service or would have it shortly in the natural course of events. The reason why some of his farmer friends—one in eight—have service is because they live close to non-farm neighbors who create customer density high enough to prevent an inescapable and continuing loss for the utility.

What about the other seven? One reason why they don't have service is because there are less than half as many non-farm neighbors in this sparser territory to dilute the costs of service to the point where the farmer would come somewhere near paying his way. A bigger and better reason is that the unserved farmers are not clamoring for the service. Folks who are clamoring for farmer votes are doing the clamoring on behalf of the unvocal farmer. Unfortunately the mass farmer has not been sold on the virtue of electricity on his farm. He is no more a self-starter than the householder was about refrigeration or the retail store is today about adding lighting and adopting air-conditioning.

Electricity wants to work for the farmer. The administration wants the farmer to work for it; i.e., electricity. Therefore there is a law and a subsidy. Hudson Reed in his Atlantic City paper said the $100,000,000 allotment could make a fine beginning if the line building is not indiscriminate but chooses the areas where the unserved farm density is best and where the farmer has a bit of means to pay for wiring and appliances. He pointed out that adherence to this would probably take care of 200,000 new farm customers this year and with them about 300,000 non-farm users, provided the costs of rural lines and farmers' outlay for wiring and electrical facilities could be financed on a low-interest long-term basis.

This would call for between $300,000,000 and $400,000,000 to be borne equally by those who build the lines and those who spend to make use of the service possible on their farms. Even under the most favorable conditions the business will entail a loss for the utilities at the outset. The industry is ready, however, to co-operate with the government agency, but it has a right to expect that the rates in the towns and cities be not further whittled down while the companies are making this social contribution for the good of the farmer and the political contribution for the good of the larger cause.

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A Notable Record of Power Interchange

TANGIBLE savings of slightly more than $4,000,000 have been realized by the Connecticut Valley Power Exchange during the first decade of its operation terminating a few weeks ago. This amounts to about 1 mill per total kilowatt-hour in-and-out movement between the participating companies and illustrates the importance of very small economies per unit when multiplied into the totals involved in large interchange transactions.

From the beginning of this notable interconnection under the leadership of Messrs. Ferguson, Soren, Lawrence, Hunt, Day, McKearin and others, in adherence to the terms of a "gentlemen's agreement" covering less than a typewritten page of co-operative sharing principles, the interchange of energy has never failed to result in substantial yearly savings. The reliability of service in central New England has been greater because of this undertaking; water which would otherwise have been spilled in wasted flow has been conserved, and a large tonnage of fuel has been saved. The economies achieved have been influential in reducing the price of electricity to the public over a considerable area during the period in which the exchange has been functioning.

The executives of the Hartford, Western Massachusetts, Connecticut Light & Power and other utilities tied into this system of interchange would be the last to claim priority as pioneers in this kind of work. Compared with the far-flung tie-ins of many other regions, the set-up of the C.P.V.E. is of very moderate dimensions geographically. It is an outstanding example, however, of systematic management. The intensive cultivation of its field has been based upon early recognition of the value and necessity of complete records, adequate instrumentation, the establishment and maintenance of sound methods of operation, avoidance of legal complications in daily working, first-class communication and headquarters office facilities, careful training of staff, friendly and straightforward relations with other system operators, co-operation in emergencies, and a thoroughly professional treatment of inter-

change. Underneath everything else, the economic analysis of exchange practice and the systematic investigation of troubles occurring on lines and at plants have been keynotes of policy. The simplicity of the basic agreement among the participating companies has never been surpassed to our knowledge.

With the expansion of interconnection throughout the East, conditions at Buffalo on the west, at Conowingo on the south and at Fifteen-Mile Falls in the north all have a bearing upon plant usage in the exchange area. The management of the exchange under C. W. Mayott has won friends throughout the Eastern power zone of the country, and without losing sight for a moment of the many other organizations whose work has been on an equally high plane of service, congratulations may be tendered to the C.V.P.E. on the completion of its first decade. It is to be hoped that no ill-advised governmental restrictions on interstate transmission as threatened in the pending Wheeler-Rayburn bill before Congress will impair the future capacity of such an organization as this to continue its excellent service to the public.

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T.V.A. Ignores Comptroller's Precepts in Expenditures

MUCH-HERALDED as it has been, nevertheless T.V.A.'s yardstick rate is based on a mere remnant of what the government had on its books to cover properties handed over to the authority. In addition to the arbitrary 61½ per cent write-down and the provision of utterly inadequate depreciation reserves, Comptroller-General McCarl's audit charges almost everything but mayhem and blasphemy against the T.V.A. manipulators. Buying under improper specifications and bidding, paying twice for things and services, excessive expense accounts, payrolls paid without administrative approval, purchase of property without acquiring clear title, rents too high, payments for goods in excess of amounts invoiced, loans to co-operatives without security, etc., are just a few of the indiscretions of T.V.A. accounting.

Nothing is said about passing red lights, but that charge was probably waived because it could be construed as embracing all the others. Exposure of this defiance of what little of the ethical there is left in the administration of governmental business amounts to more than a mere caution signal for the authority. If they squander so profligately there never will be the yardstick-rate profits they predict, even on the abbreviated book value, so long as their income and outgo shall be treated as business would do it.

Those who railroaded the T.V.A. measure through Congress may have had the purest of motives, but their satellites are now apparently doing in high-handed bureaucratic fashion just what most such governmental agencies do in feverish haste when they get access to our treasury and taxes to provide them with jobs and a freedom to play fast and loose in ways that business never would condone. Chairman Morgan, in disputing the charges and at the same time supporting the T.V.A. request for $50,000,000 more bond leeway, said that the expenditures were justified by sound engineering and that his staff could "explain satisfactorily every substantial exception to our expenditures noted in the comptroller's audit."

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Hold NIRA Advantages

A UNANIMOUS decision of the Supreme Court has thrown the essential feature of NIRA overboard. It definitely puts a stop to federal attempts to dictate to business and to centralize control of business in Washington. The states and business are reassured as to their rights under the Constitution. Industry can go forward on its own initiative. Much uncertainty and ill-considered legislative proposals have been eliminated.

But the NIRA experience was valuable. It introduced elements of fair practice, labor, cost accounting, statistics and co-operation that were found worthy and workable by business. This was especially true in the manufacturing branch of the electrical industry. These advantages can be retained and should be retained. Enforcement by law was unworkable and is still unworkable, but voluntary co-operation by business enterprises is necessary today and is in the public interest. We hope that the work undertaken and the going organizations developed in the electrical industry will continue. Self-government, co-operation, dissemination of information, discussion of common problems—all these values remain and are necessary to stable and prosperous business.

Even before NIRA the electrical industry had gone forward along this path. Now the NIRA experiences should be capitalized upon as well as those of the past to perfect and make effective co-operation within each branch of the industry and between the branches of the industry. The constructive endeavor should be to retain all the good elements of the codes on a voluntary basis and to institute effective industry self-government within the law.

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Are Transformers Too Efficient?

ALTHOUGH this may once have been a paradoxical question, it is so no longer; it is, in fact, pertinent to inquire: Are transformers too efficient? Have we, in our desire to secure the very maximum efficiency that engineering and materials could practically accomplish, overstepped the economic limits beyond which lies the bog of unsound enterprise?

Admittedly, losses are an important item in transmission system operation. But it must be remembered

that while transformer losses have been consistently cut down, the price of such losses has gone down also. While transformer losses have decreased from 2 per cent to 1.5 per cent down to 1 per cent, and to even as low a figure as 0.7 per cent, steam capacity costs have gone down from $150 per kilowatt, to $90, $80 and in some cases to $70 and less. The price of the engineering portion of the loss item has, in the meanwhile, gone down in the same ratio and, if anything, even lower. Thus, the structure necessary to support, in an economic sense, a saving of a kilowatt of losses has grown weaker. But so far this has had no appreciably retarding effect on the quest for further loss reductions.

Here is obviously an element of unsoundness. If the object of efficient transformers is to obtain a minimum cost of a delivered kilowatt of capacity and net minimum cost of energy on the consumers' premises, and particularly in view of the admitted necessity of reducing unit investment costs, isn't it time to reappraise the entire loss situation? It would appear that here is a fertile field both for the transformer and for the power system engineer.

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"Try, Then Buy," Works for School Lighting

FAINT heart never won any lighting business. That admonition is addressed to the lighting sales engineers who are prone to give up because a few school boards, not always able to pay the teachers promptly, have also at times let their lighting bills go in part unpaid. No matter how penurious they have to be, the school authorities have learned that light must be adequate in the schoolroom if the eyes of future generations are to be preserved. They have learned especially that ample light is imperative for that percentage of pupils already handicapped by partial vision. More recently they have learned that pupils with defective hearing need plenty of light so they can use their eyes—to read lips—to supplement their weak ears.

As long as the municipal treasuries run low there is no reason to expect success in a grandiose scheme to put all schoolrooms on a proper level of illumination. But there is reason to believe that many boards would put trial installations into key rooms. In fact, a well-known educator as much as put that suggestion into words for Walter Sturrock of Nela Park, and he is advocating it diligently. That the trial scheme has proved fruitful is attested by the experience in Ohio with sight-saving classrooms. East Cleveland started it, and now Youngstown and Mansfield have such well-lighted rooms for half-seeing school children; at least two other cities are on the point of decision. It is contagious. Trial is persuasive, even if focussed on a limited objective. Experimental installations are as convincing in the schools as in the kitchen.

Evaluating Equipment Ages

AS MAINTENANCE costs trend upward with increasing plant ages it is helpful to analyze such outlays more critically than before. The operating engineer desires to find out why particular repair expenses have risen in seeking a better understanding of controlling conditions. Maintenance is a function of service and character of plant handling practiced, but it is also profoundly affected by the time element in equipment life. There is no prospect at present of setting up a highly accurate scheduling of plant repair control based on mathematical computations of age as against service performance. None the less, knowledge of equipment ages expressed in average elapsed life of apparatus groups is useful as a rough yardstick in studying costs.

A simple method of obtaining approximate average ages of apparatus groups consists of multiplying the years elapsed since the installation of each similar piece of equipment by its rating in kva., horsepower, or what not; adding these totals and dividing by the total rating of the group to reach the desired index figure. Thus, a typical steam turbine installation of four units aggregating 48,125 kva. was found to have an average age of 9.17 years. The oldest machine was rated at 4,780 kva., and was nineteen years of age in 1934. The product of its rating into its age was 90,280, whereas the product of the rating of the newest unit (25,000 kva.) into its age of five years was 125,000. The sum of the products for the four units was 441,420. This last figure expresses a weighted value for the turbo plant embodying both age and rating for the group of equipment taken, and from it is derived a quantitative expression of average age which has some significance in the examination of costs. Graphs of maintenance costs per kilowatt-hour generated set against plant ages have revealed curves of sufficient smoothness to indicate a positive relationship between these co-ordinates.

The above approach to a maintenance yardstick does not discount the value of recording and studying repair costs and ages of individual equipment units. Portions of plant, including what might be classified as non-symmetrical assemblies of apparatus like pumps of various kinds, piping, auxiliary switchboards, etc., represent such heterogeneous equipment that group age determinations are less useful than in dealing with heavier units. Since the major investment in plant centers in generating equipment, including boilers in steam stations, average age indices carry a dominating significance for the groups covered, sometimes being extended to the plant as a whole without unreasonable inaccuracy. The need for periodic testing of boilers, electrical insulation, turbine check-ups and sustained scrutiny of operating efficiency is as great as ever. Definite steps toward providing age ratings, however, point toward a better understanding of equipment performance, and the power industry needs all the light it can obtain upon the intangible but real factors in efficient service in the time element in plant utilization.

Curbs in T.V.A. Bill Predicted

Following White House conference McSwain presents possible modifications — Norris claims McCarl demand defeats entire object of Tennessee Valley act — Alabama Power Company loses decision

Despite passage by the Senate, legislation to broaden the scope of the Tennessee Valley Authority appears destined to be modified materially by the House military affairs committee, which last week tabled by a vote of 13 to 12 the pending amendments to the bill. Following this expression of hostility, a conference was called at the White House by President Roosevelt which Chairman McSwain of the House military affairs committee and others attended.

Mr. McSwain offered several amendments to the committee, but they were not well received and insurgent members refused to incorporate them in the controverted bill. They were: (1) To restrict T.V.A. domination of the tributaries of the Tennessee River so as not to affect adversely such private interests as the dam, power and reservoir system of the Aluminum Company of America on the Little Tennessee; (2) to put T.V.A. under a cost-accounting system, set up by the Federal Power Commission, under which the T.V.A. yardstick would be fashioned; (3) to give the Comptroller-General of the United States full control over T.V.A. construction expenditures when the Norris and Wheeler Dams are finished; (4) to bar sales of T.V.A. power below production cost after the T.V.A. power business had developed to a point where it could be self-sustaining; (5) to let the power commission decide when T.V.A. was producing surplus power which might be marketed to non-governmental consumers; (6) to eliminate from the Senate bill a provision that would let T.V.A. buy up private power facilities for resale to communities.

Norris-McCarl controversy

In a controversy with Comptroller-General John R. McCarl, Senator Norris voiced the fear that the power rate yardstick of the T.V.A. would be wrecked by court injunctions and audits. The author of the T.V.A. act and Mr. McCarl, who has urged that the authority be placed under closer supervision of his general auditing office, made public an exchange of letters showing their outspoken disagreement over financial affairs of the T.V.A.

Mr. McCarl informed Senator Norris that the T.V.A., as an agency spending public funds, should be checked closely by the Comptroller's office. Of exceptions taken by his auditors to T.V.A. policies, Mr. McCarl asserted he had found "a uniform conviction that many exceptions might have been avoided if those acting for the authority had more carefully and wholeheartedly given effect to laws considered by this office applicable to authority transactions." Senator Norris wrote to Mr. McCarl: "By the amendment you are preparing you will subject the Tennessee Valley Authority to the technical sections of statutes, taking away from them all discretion whatsoever. . . . You will, in effect, . . . defeat the entire object of the Tennessee Valley act, and that is just what the enemies of the act want. That is just what the private power companies are trying to bring about. . . ."

Alabama Power Company's plea denied

Petition of the Alabama Power Company for an injunction restraining the cities of Sheffield and Tuscumbia, located in the heart of the Muscle Shoals district, from borrowing money from the P.W.A. to construct municipal electric distribution systems has been denied by Judge C. P. Almon of the Circuit Court in Tuscumbia. The court held that the cities were within their rights in borrowing funds and could issue bonds and deliver them to the administrator of the P.W.A. as security for loans. Attorneys for the company contended that the laws under which the P.W.A. operated were unconstitutional.

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Farm Groups Attend Meeting on Rural Electrification

Representatives of farmer co-operatives and consumer non-profit organizations throughout the country gathered in Washington on June 6 to confer with Administrator Morris L. Cooke regarding rural electrification. Delegates represented farmer organizations, banks serving farmer co-operatives and the co-operatives themselves. Among the topics considered were the types of state and local organizations which can co-operate in the matter of rural electrification, the problems which are to be confronted in the development of this program and the character of information or other services which can best be rendered by the co-operating organizations.

Representatives of municipal plants had already discussed with the Rural Electrification Administrator and his staff the method by which they can best co-operate in the expeditious completion of the program.

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N.E.M.A. Urges Observance of Code

Following Supreme Court decision President Jones advises industry to adhere to NRA principles — Utilities not affected by court ruling

In a letter sent to all members of the electrical manufacturing industry following the decision of the Supreme Court declaring the National Industrial Recovery Act unconstitutional, Frank C. Jones, president of the National Electrical Manufacturers' Association, urged that the industry continue operating under the Electrical Manufacturing Industry Code until possible legislation be enacted to continue in some form the basic principles of the NIRA.

"Mandatory operation under the Code for the Electrical Manufacturing Industry is at an end," the letter stated. "Pending possible action by Congress seeking to provide a larger measure of self government by industry, the following recommendations are made on advice of the code advisory committee: (1) Wages—no reductions in wage rates should be made. (2) 40-Hour Week—the code for the electrical manufacturing industry, having been approved in the very early days of NRA, provided for a basic work week of 36 hours. Later codes for similar industries allowed 40 hours per week. NRA recognized the unfairness of the hours stipulated in the code for our industry but for various reasons an extension to 40 hours a week was never consummated. It is believed, however, that if competitive labor conditions make it advisable for you to operate on a 40-hour week schedule, you do so, but only on condition that you do not decrease the number of your employees. (3) Statistical Reports—much benefit has accrued to the industry from the labor and statistical reports. Therefore, it is urged that you continue send-

ing these reports to N.E.M.A. (4) Operate under E.M.I. Code—In order to avoid chaos in our industry and because undoubtedly legislative efforts will be made to continue in some form the basic principles of the National Industrial Recovery Act, it is urged that, pending determination as to future legislation, you continue operating in accordance with the provisions of the Electrical Manufacturing Industry Code."

Voiding of the NRA codes will have no effect on the utilities, as the electric and gas industries have not been operating under codes. Much time and expense was devoted to drawing up codes, which were submitted and hearings held, but they were never approved by President Roosevelt.

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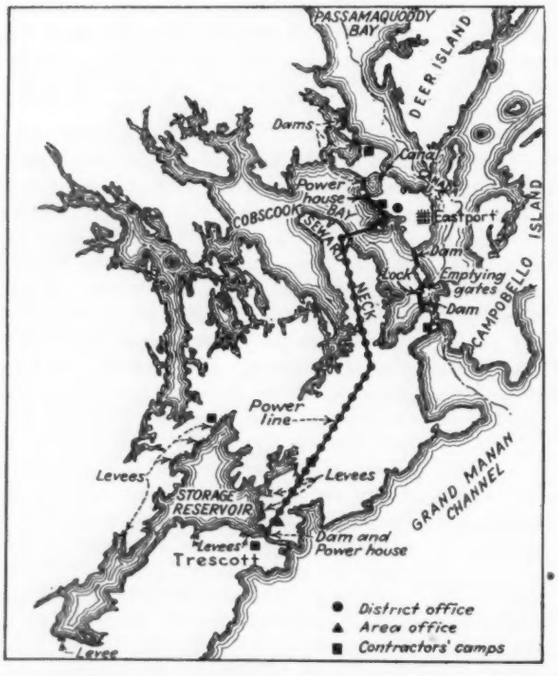
British Output Up 11.9%

Official returns rendered to the British Electricity Commission show that 1,330,000,000 units of electricity were generated by authorized undertakers in Britain during April, 1935, compared with the revised figure of 1,188,000,000 units in the corresponding month of 1934. This constitutes an increase of 142,000,000 units, or 11.9 per cent.

ARMY ENGINEERS TO START WORK ON MAINE PROJECT



Less ambitious than the Dexter P. Cooper plan and thus avoiding immediate complications with Canadian provinces, the Passamaquoddy Tidal Power Project uses 5 ft. of the 18-ft. tide differential in conjunction with surplus-energy-pumped storage (130 ft. elevation) to develop 166,670 kva. initially, 366,674 ultimately

Redrafted Holding Company Bill Meets Opposition in Senate

Lively debate follows introduction of revised measure — Constitutionality vital point — Intrastate curbs feared — Modification by House committee expected — Business leaders suggest changes

Prefacing his introduction of the consideration of the redrafted holding company legislation with the insistence that the utility companies had been given a fair hearing before the Senate committee on interstate and foreign commerce, Senator Wheeler found his efforts to allay the fears of many Senators that, since the Supreme Court's NRA decision, it would be difficult to enact a constitutional utility bill, not altogether successful.

The debate on the rewritten bill commenced on Wednesday, May 29. Venturing the statement that there are many holding companies which will have to reorganize themselves whether the holding-company bill passes or not, Senator Wheeler emphasized that under the terms of the proposed legislation they can become investment trusts, divorced of management control of their operating subsidiaries, establish themselves as regionally integrated systems, or reorganize along wholly intrastate lines. His insistence that the bill as now drawn was sufficiently explicit in its definitions, and its procedure for a judicial review of findings, to pass the Supreme Court's scrutiny was vigorously opposed by Senator Hastings (Delaware) and Senator White (Maine). It was apparent that much of the early consideration of the measure would revolve around this question of constitutionality. As much was definitely forecast by Senator Hastings when he said: "I, as have members of the Supreme Court, have taken an oath to support and uphold the Constitution, and if I am satisfied that this bill is unconstitutional, regardless of what I may think of its purposes and how good they may be, it becomes my duty to oppose it. That is the ground of my opposition to this bill."

Senator Borah, entering the discussion at this point, said: "If the abuses, which are here denominated and characterized, were abuses of corporations which are wholly intrastate, there could be no doubt that the state could take control of and correct those abuses; if, by reason of the fact that they are dealing across state lines and affect the people of many states they come to be interstate, then what the state may have been able to do with reference to intrastate, Congress may do with reference to interstate. Then the only question involved is whether or not holding companies which are dealing across state lines and selling their securities, and holding subsidiary companies sending electricity across state lines, are engaged in interstate business. If they are, Congress has the power through the exercise of what we might call a police power—it is not the police power, but is the same as police power—to purify and cleanse it of all injustice and evils, just as the state could do with intrastate business. The only question involved is whether or not the holding companies are engaged in interstate business."

Agreeing entirely with Senator Borah, Senator Wheeler declared himself at a loss to understand how Senator Hastings could interpret Section I of the bill as having anything to do with whether or not these companies were engaged in interstate commerce. "As a matter of fact," continued Senator Wheeler, "all this section does is to denounce certain definite practices which we say are bad. We say that Congress has jurisdiction because the companies are engaged in interstate commerce. Of course, if those bad practices are engaged in only by companies engaged in intrastate commerce and not subject to the commerce clause, we have no jurisdiction."

Protesting Senator Hastings said: "This is not merely regulation. If these practices exist and these companies are engaged in interstate commerce, of course the Congress would have a right to regulate, but the bill goes further than that. The bill destroys them. . . . It is proposed not only to prohibit the bad company from engaging in interstate commerce, but we prohibit them all, and it is admitted many of these companies are perfectly clean and need no regulation at all. It is proposed not only to regulate if improper conditions may be found to exist, but it is proposed to wipe them out entirely.",

Senator Norris' position on the proposed legislation was clearly indicated in his statement that: "In all the years of my investigation of power companies I have been unable to find a single instance where a holding company in the second degree is of any benefit to society. On the contrary, it is always a great danger and affords a strong temptation for dishonest men, or men moved only by the desire to create great wealth for themselves, to perpetrate a great injustice upon the people of the country. In my judgment, when we come into the holding company field beyond the first degree there are no good holding companies, and I do not think any of them ought to be saved. Justice demands that we pass this legislation."

Constitutionality of the bill was again the paramount issue in the discussion on Wednesday of this week when Senator Dieterich of Illinois, addressing himself briefly but forcefully to this question, said: "There are abuses which this bill presumably seeks to remedy, but instead of remedying them the bill uses the sentiment against those abuses for changing the situation entirely and I think eventually destroying the entire private ownership of utilities."

A move to drive the bill back into committee was thwarted by a speech of Senator Brown of New Hampshire, who asserted that the whole utility holding system is a "racket" engaged in "juggling cash" and stripping investors. He had learned, as a member of the New Hampshire Public Service Commission, said Senator Brown, "that the dangers of the holding company business have been understated, not overstated."

Meanwhile, Mr. Rayburn's House interstate committee continued hard at work in executive sessions on Title I of its draft of the holding company bill. Probably to be more completely rewritten from its original draft than was the case in the Senate, this version of the proposed legislation is regarded as more likely to indicate the extent to which the Administration is prepared to go in accepting a modified act.

Fifty-two business and industrial leaders comprising the Business Advisory Council of the Department of Commerce have made a report suggesting changes to correct present evils of holding companies.

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Johnson Bill Awaits Action

The Johnson bill to legalize the status of Parker Dam and other P.W.A. projects on streams that may also be held as navigable in line with the U. S. Supreme Court's recent decision (ELECTRICAL WORLD, May 11, page 47), has been reported by the Senate Commerce Committee and is awaiting action on the Senate calendar. In recommending enactment of the bill, Secretary of the Interior Ickes explained that "it was not considered necessary, prior to the Arizona decision, for the inclusion of certain river and harbor improvements in the comprehensive program (P.W.A.), that the recommendation of the Chief of Engineers of such projects actually be submitted to Congress.

"It follows," said Secretary Ickes, "that these projects must be authorized by Congress also in order to remedy this situation."

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Insull Trial Opens June 11

Preparations for the new trial on June 11 of Samuel Insull, who with eight co-defendants, is charged with violation of the bankruptcy laws, began last week when A. Harness and Harold Huling, Assistant United States Attorney Generals, arrived in Chicago from Washington. Subpoenas were prepared at once for the appearance at the trial of Louis S. Timmerman, president of the Central Hanover Bank of New York; James A. Jackson, vice-president of the National City Bank of New York, and A. J. Stilwell, vice-president of the Continental Illinois National Bank & Trust Company of Chicago. The subpoenas call also for the records of the institutions relating to transactions with the Corporation Securities Company, the Insull unit which will be under fire at the trial.

Public Service Company of Northern Illinois has also consummated refunding of $10,650,000 of 7 per cent debentures due in 1937. The company is also planning to refund at an early date $16,000,000 of 6½ per cent, series H, first lien and refunding mortgage bonds maturing in 1952.

Control of the Penn-Southern Power Company, created to own five former Insull operating companies in Eastern states on behalf of creditors of two of the bankrupt holding companies, has been sold to E. P. Furber of Boston for an amount exceeding $900,000.

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Colorado River Contract Reaches Impasse

Declaring it impossible to reach an agreement with California, the Arizona Colorado River Commission recommended last week suit in the United States Supreme Court in a report submitted to Gov. B. B. Moeur of Arizona. Court action to limit the use of water by California to provisions of the Boulder Canyon project act is advocated.

"When Secretary of the Interior Ickes on December 17 directed Arizona and other compact states to agree on the form of a contract, he was asking the impossible," the commission said. "Arizona can agree with Wyoming, Colorado, Utah and New Mexico, but the differences between Arizona and California are fundamental and cannot be adjusted by agreement."

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New York Utilities Launch New Merchandising Plan

A new co-operative plan for the increased sale of electrical appliances by dealers has been launched by the New York Edison Company and the United Electric Light & Power Company. The successful carrying out of the plan requires the co-operation of manufacturers, distributors, dealers and the utility. Since July 1, 1933, when they ended the practice of selling directly to customers, the companies have been engaged in a program of appliance sales promotion which included the turning over of leads to dealers to complete the sales. Now they will take orders for merchandise and will transmit these orders to approved local dealers. The companies will not accept any part of the purchase price of appliances sold. All financial transactions, whether on cash or deferred-payment sales, will be handled by the dealer who fills the order.

The plan, according to E. F. Jeffe, assistant vice-president in charge of sales of the two companies, assures to all users of electric service suitable and acceptable electric appliances. The plan will be restricted to appliance dealers of high standing, he said, and will be limited to the sale of appliances that have been tested and approved by the companies. One of the required qualifications of dealers is membership in the Electrical Association of New York. The recent filing of materially reduced electric rates opens a field of great possibilities to the electric appliance dealer, Mr. Jeffe pointed out.

COMING MEETINGS

Public Utilities Advertising Association—Annual convention, Chicago, June 9-12. Clayton G. Cassidy, Peoples Gas Light & Coke Company, 122 South Michigan Avenue, Chicago, Ill.

American Society of Mechanical Engineers—Semi-annual meeting, Cincinnati, Ohio, June 19-21. C. E. Davies, 29 West 39th Street, New York.

Associated Municipal Signal Services—Hotel Campbell, Poughkeepsie, N. Y., June 20-22. Edwin P. Cochran, secretary-treasurer, 420 Yale Avenue, New Haven, Conn.

American Institute of Electrical Engineers — Summer convention, Ithaca, N. Y., June 24-28. Pacific Coast convention, Seattle, Wash., August 27-30. H. H. Henline, national secretary, 33 West 39th Street, New York.

American Society for Testing Materials—Annual meeting, Book-Cadillac Hotel, Detroit, Mich., June 24-28. R. E. Hess, assistant secretary, 260 South Broad Street, Philadelphia, Pa.

Canadian Electrical Association—Annual meeting, Algonquin Hotel, St. Andrews-by-the-Sea, N. B., June 26-28. B. C. Fairchild, secretary, 409 Power Building, Montreal, Que.

Cortelyou to Quit Consolidated; Smith Will Assume Presidency

Compulsory retirement rule for all employees over 70 adopted by company — Plan effective July 1 — Several other executives involved

George B. Cortelyou will retire as president of the Consolidated Gas Company of New York, after 26 years in that office on July 1, and will be succeeded by Frank W. Smith, who will continue as president of the New York Edison Company. Oscar H. Fogg, vice-president of Consolidated Gas and New York Edison, has been elected executive vice-president of the Consolidated Gas Company. These changes were voted at a meeting of the board of trustees of the Consolidated Gas Company this week after the board had approved the report of a special committee recommending the compulsory retirement of employees and officers at the age of 70 years.

In addition, John A. Garver, a director and member of the executive committee since 1918, resigned on account of age. Other officers of the affiliated companies who will retire under the plan are: H. L. Snyder, president New York & Queens Electric Light & Power Company; W. G. Hoyt, president Standard Gas Light Company of the City of New York; E. S. Bellows, treasurer Westchester Lighting Company and Yonkers Electric Light & Power Company, and C. A. Barton, vice-president New York & Queens Electric Light & Power Company.

For many years the company has had in effect a superannuation plan applicable to employees and officers who have completed 25 years of continuous service. The new plan follows the general principles of that heretofore in effect, except for the requirement of compulsory retirement, and it will become effective in all of the companies affiliated with the Consolidated Gas Company on July 1. Of the combined personnel of the group of companies affiliated with the Consolidated Gas Company, approximately 200 will be affected by the retirement provision of the plan.

Mr. Cortelyou is the fourth president of the Consolidated Gas Company. He joined the organization in 1909 as president and trustee, just after he had retired as Secretary of the Treasury in President Theodore Roosevelt's cabinet.

He has the distinction of being the only person to serve as president of both the National Electric Light Association and the American Gas Association. In 1918 he became the first president of the American Gas Association, serving two terms. He was elected president of the National Electric Light Association in 1932, and later became president of the Edison Electric Institute.

G. B. Cortelyou

Frank W. Smith, who will become president of Consolidated Gas, is one of the distinguished veterans of the electric light and power industry. He has been active in the industry for more than 55 years. His electric career antedates that

F. W. Smith

of the present industry because, as a boy, he took a job with one of the earliest arc-lighting organizations, the United States Illuminating Company, which subsequently became part of the present United Electric Light & Power Company. He became secretary of the United in 1905, and several years later he was elected vice-president and in 1916 vice-president and general manager. He was made vice-president of the New York Edison Company in 1931, and in 1932, he was elected president of both companies. Mr. Smith at present is a member of the board of trustees of the Edison Electric Institute, a member of the membership committee and chairman of the Institute's prize awards committee. He is a past-president of the National Electric Light Association and is a member of the American Institute of Electrical Engineers, Electrical Association of New York, New York Electrical Society and many other technical organizations.

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Consolidated Gas Offers $7,566,500 Rate Cut

Proposals for reductions in electric rates in New York City amounting to $7,566,500 a year, to become effective as soon as approved, have been filed with the Public Service Commission by the electric companies of the Consolidated Gas Company group. With the reductions just made in Westchester County and the reductions to the city and federal governments, the proposed rate cuts make a total reduction of $10,578,500 a year.

The reductions are proposed subject to approval by the Public Service Commission of a consolidation of the New York Edison Company and the United Electric Light & Power Company in the interest of economy, and on condition that the new rates for retail, commercial, general and wholesale uses may not be available to those customers who purchase electricity for submetering and resale. The application for consolidation was filed this week.

In the meantime Mayor LaGuardia met defeat at the hands of the Board of Estimate when that body refused to approve his proposal to seek a loan from the federal government for a $45,000,000 municipal power plant. A public hearing on the Mayor's proposal will be held June 19.

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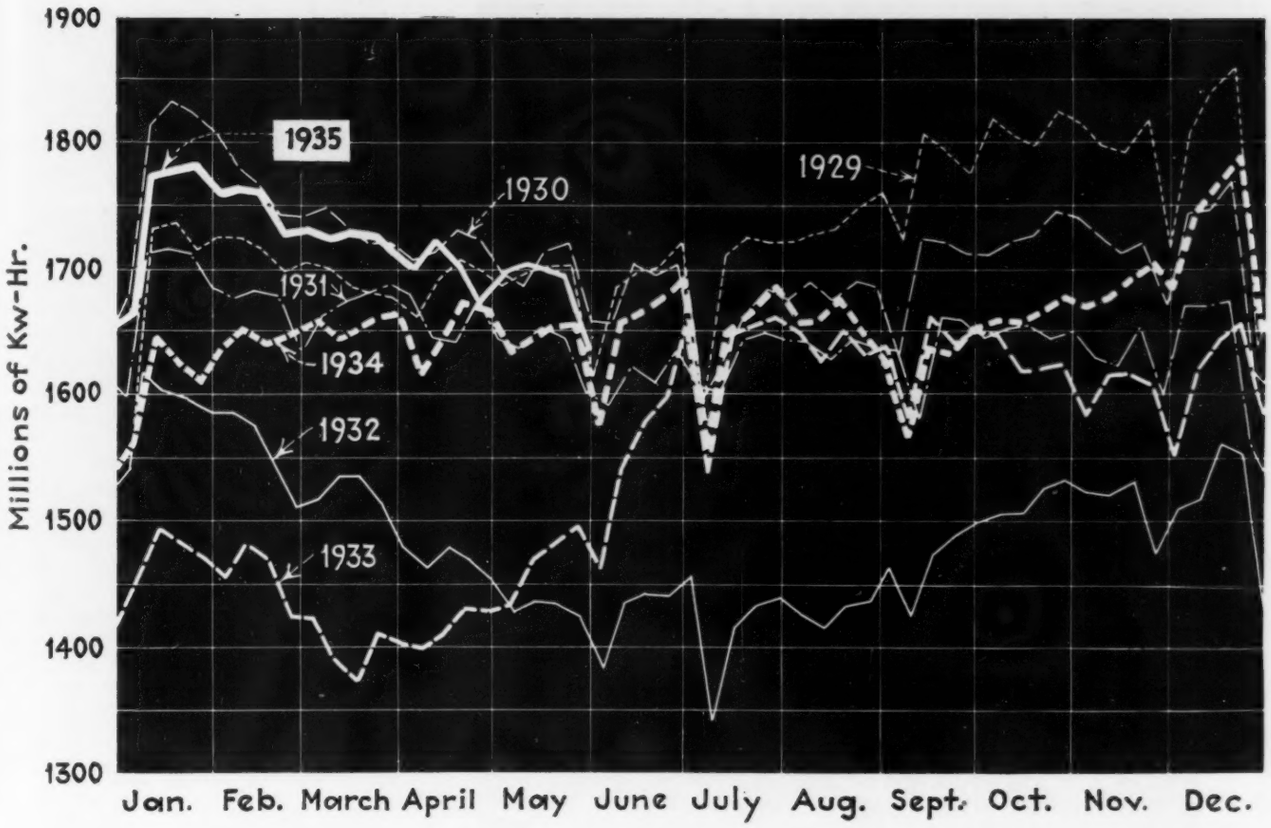
Toledo Power Strike Ended

Less than twenty-four hours after electrical workers of the Toledo Edison Company went on strike, a mass meeting of union members voted, 237 to 22, early Thursday, June 6, to return to work immediately, pending the outcome of negotiations on a 20 per cent wage increase. The walkout started on Wednesday morning and by nightfall 400,000 persons in northwestern Ohio were threatened with a suspension of electrical service. Several factories in Toledo were forced to shut down and other plants operated on a restricted scale. Following an appeal from Secretary Perkins in Washington to maintain "essential services," union leaders called the mass meeting of strikers at which a temporary agreement was reached.

May Output Ahead of 1929



Averaging 3.3 per cent higher than in 1934, the output of central electric light and power plants during the five weeks ended June 1 slightly exceeded that of the like period in 1929 and came within a fraction of one per cent of matching the record established in 1930. After holding virtually constant for four consecutive weeks it underwent the usual drop in the week of Memorial Day, but surpassed the corresponding figure in 1934 by 3.3 per cent and in 1929 by about one per cent. As reported by the Edison Electric Institute it amounted to 1,628,520,000 kw.-hr., against 1,696,051,000 kw.-hr. in the week ended May 25.

For the first time since the middle of March the Pacific Coast reports an excess compared with the preceding year, so that every section of the country now shows a gain. Persistent high percentages in the Rocky Mountain region point to greater activity in mining, while a more moderate pick-up continues in the leading manufacturing areas. In the Central States the lead over 1934 has lately been decreasing.

Weekly Output, Millions of Kw.-Hr.

1935	1934	1933
June 1...1,629	June 2...1,576	June 3...1,461
May 25...1,696	May 26...1,655	May 27...1,494
May 18...1,700	May 19...1,650	May 20...1,483
May 11...1,702	May 12...1,643	May 13...1,468
May 4...1,698	May 5...1,633	May 6...1,436
Apr. 27...1,673	Apr. 28...1,669	Apr. 29...1,428

Per Cent Change from Previous Year

Region	Week ended June 1	May 25	May 18
New England	+ 3.5	+ 1.5	+ 2.6
Middle Atlantic	+ 3.5	+ 1.4	+ 3.3
Central Industrial	+ 2.7	+ 1.7	+ 4.0
West Central	+ 2.3	+ 5.0	+ 7.2
Southern States	+ 3.8	+ 1.6	+ 2.6
Rocky Mountain	+14.7	+15.7	+17.6
Pacific Coast	+ 1.1	— 1.4	— 4.9
United States	+ 3.3	+ 2.5	+ 3.0

Hydro Output Breaks Record

Output of public utility plants during April surpassed that of the like month in 1934 by 5 per cent, rising to 7,819,227,000 kw.-hr., according to the U. S. Geological Survey. Contrary to the usual trend, which shows an average decrease of 1 per cent in the average daily output in April compared with March, this year's operations brought an increase of 1 per cent.

The new figure is only 0.8 per cent less than the production for the corresponding month of 1929 and it missed the April record, made in 1930, by 2.5 per cent. The amount generated from water power was 3,612,197,000 kw.-hr., the largest ever produced in any one month, and was 46 per cent of the total. The highest percentage (though not the highest amount) was about 49 per cent in May, 1933. Output from that source was up 3.4 per cent compared with a year ago, and from fuel 6.1 per cent.

Stocks of coal again increased and on May 1 the total quantity on hand at power plants was 7,438,430 tons.

The quantities reported by the Survey include operations not only of central stations but of railway and other plants generating energy for public use.

Regional changes in per cent referred to the preceding year were as shown in the accompanying table.

	Jan.	Feb.	Mar.	Apr.
United States	+ 9	+ 6	+ 4	+ 5
New England	+ 9	+ 4	+ 3	+ 5
Middle Atlantic	+ 7	0	— 1	+ 3
East No. Central	+ 8	+ 7	+ 2	+ 6
West No. Central	+21	+16	+17	+21
South Atlantic	+ 9	+13	+ 6	+ 4
East So. Central	+19	+18	+14	+ 9
West So. Central	+ 9	+ 5	+ 7	+ 8
Mountain	+ 7	+10	+10	+12
Pacific	+ 8	+ 5	+ 1	— 6

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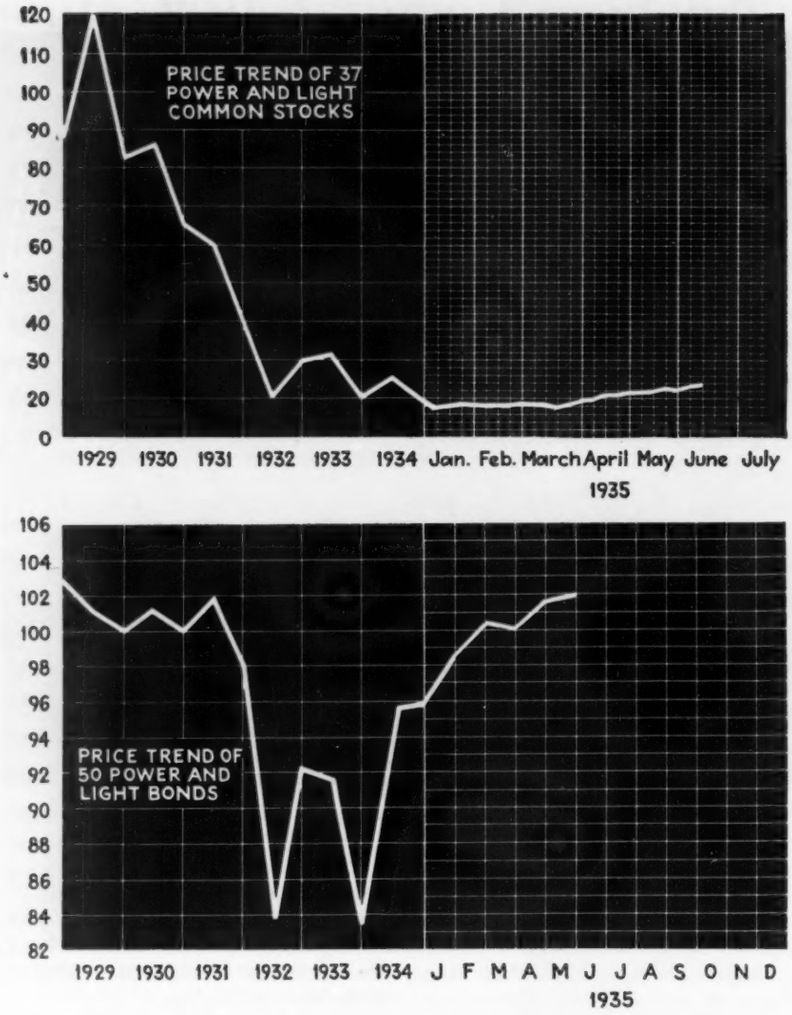
Utility Denied Rehearing

Application of the Niagara Falls Power Company for reargument of its case against the New York State Water Power and Control Commission in the matter of payment for excess water diverted from the Niagara River (ELECTRICAL WORLD, April 27, page 46) has been denied by the Court of Appeals in Albany, with $10 costs and necessary printing disbursements.

Utility Securities Move Upward



Sharing in the substantial progress made this week by the security market, utility stock prices advanced—"Electrical World" index, 24.0; last week, 23.5. The utility bond list displayed a firm tone in May—"Electrical World" index, 102.2; April, 101.7

Utility Reorganization Progresses in Portland

A milestone in the financial reorganization of Portland Electric Power Company, Portland, Ore., and its chief subsidiary, Portland General Electric Company, was passed early in May when 85 per cent of the holders of the first and refunding 4½ per cent mortgage bonds of Portland General Electric Company had granted permission to the company to seek extension of $6,000,000 of a senior issue of 5 per cent bonds due July 1 this year. Under the trust indenture of the 4½ per cent debentures no extension of security date of previous issues could be made without consent of the bondholders.

Last fall Portland General Electric Company, realizing the impossibility of paying the 5 per cent issue on maturity on July 1, and of the extreme difficulty of refinancing these bonds by any new loan, asked the holders of the 4½ per cent debentures for their waiver of the trust provision referred to above and consent to the seeking of an extension on the prior lien 5 per cent bonds. By provision of the mortgage covering the 4½ per cent issue, agreement of 85 per cent of the outstanding face value of the issue was required to permit such procedure.

A letter has now gone out to holders of the 5 per cent bonds of 1935 asking for an extension of fifteen years on the maturity date.

•

Seeks Operating Status

In one of the first moves to meet the eventualities of the Wheeler-Rayburn bill, directors of the Nevada California Electric Corporation, $50,000,000 holding company controlled by the Phipps interests, have approved amendment of the company's certificate of incorporation to permit the corporation to assume the status of an operating company. A. B. West, president, has called a special meeting of stockholders to be held in Denver on June 21 to approve the action of the directors.

•

New Orleans Utility Seeks to Reorganize

Hearings on the proposed plan of reorganization and bond extension of the New Orleans Public Service, Inc., will be held in the District Court of the United States for the Eastern district of Louisiana on June 17, in New Orleans. The hearings will determine whether the company is to remain in possession of its assets and properties or whether trustees shall be appointed by the court.

The company has filed under Section 77-B of the bankruptcy act and in its reorganization has offered to pay bondholders 10 per cent in cash and extend the remainder into 5 per cent bonds maturing July 1, 1942. The company has $11,546,800 of 4½ per cent bonds maturing on July 1. About 84 per cent of outstanding bonds have been deposited under the plan.

•

More Utility Bond Issues

Public offering was made this week of $29,500,000 of the Commonwealth Edison Company's first mortgage 3¾ per cent bonds due in 1965, priced at 98 and accrued interest, to yield about 3.68 per cent. The proceeds will be used to redeem the company's outstanding issues of $17,500,000 first mortgage 5½s, series G, due in 1962, and $12,000,000 collateral mortgage 4½ per cent bonds, series E, due in 1960.

Offering was made last week by the San Diego Consolidated Gas & Electric Company of first mortgage 4 per cent bonds due in 1965, priced at 101 and accrued interest, a piece of financing involving a total of $15,500,000. The new issue will replace all the company's outstanding bonds, which bear interest at rates of 5, 5½ and 6 per cent, and constitute its only funded debt.

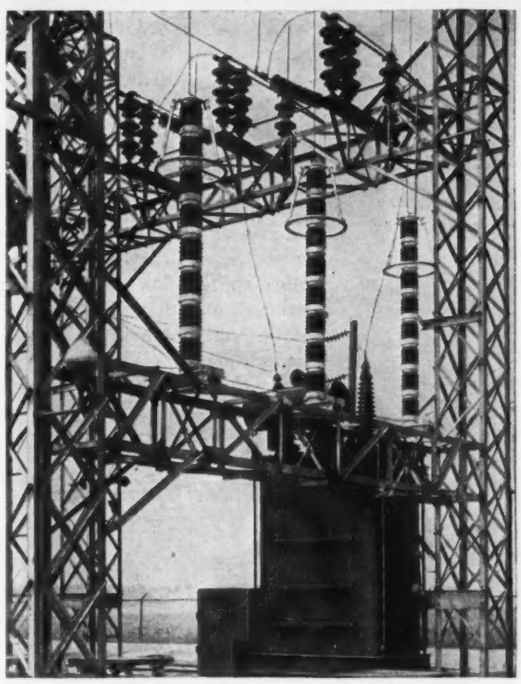
Offering was made recently of first mortgage sinking fund 4¼ per cent bonds of the Androscoggin Electric Corporation, a Maine corporation, to the amount of $4,000,000.

New York Metal Prices

	May 22, 1935 Cents per Pound	June 5, 1935 Cents per Pound
Copper, electrolytic	9.00*	9.00
Lead, Am. S. & R. Price	4.25	4.10
Antimony	12.75	12.50
Nickel ingot	35.00	35.00
Zinc, spot	4.525	4.675
Tin Straits	51.625	51.15
Aluminum, 99 per cent	19—21	19—21

*Blue Eagle.

COMPLETE LIGHTNING PROTECTION .... from the Generator to the Meter



Three-phase installation of G-E station-type Thyrite arresters, protecting 115-kv. substation equipment

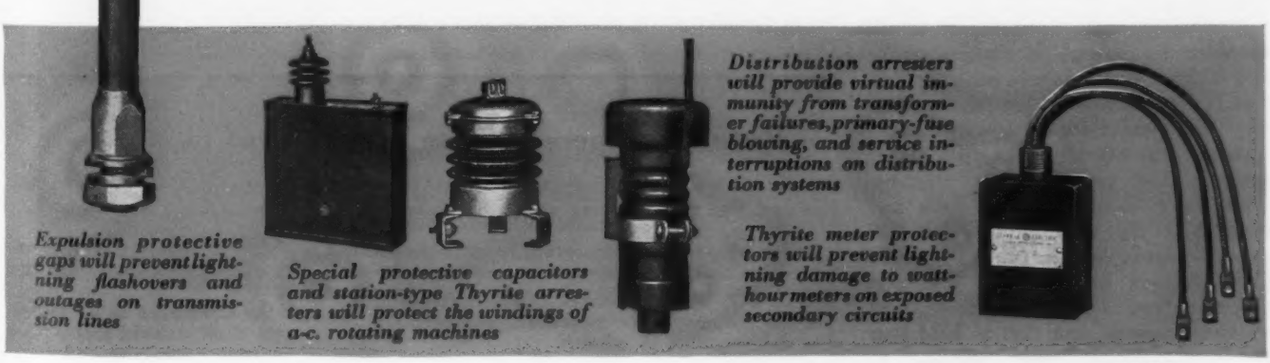
Modern Lightning Protective Equipment for Every Part of the Modern Electric System

Protect Your Station Apparatus

THE new Form D station-type Thyrite lightning arrester provides effective protection that will eliminate dangerous lightning stresses on the insulation of power transformers and other station apparatus, and will prevent lightning flashovers and station outages. This protection is reliable and results from the combination of their remarkable ability to limit lightning voltage, their low-time-lag characteristic assuring minimum voltage to start discharge, and their large discharge capacity.

These arresters, exclusively, utilize the interchangeable unit construction, affording definite economies in application and installation. Each unit (11.5 kv. rating) is common to, and interchangeable in, arresters of all voltage ratings, and is, therefore, a permanent investment.

For complete information, address the nearest G-E sales office or General Electric, Dept. 6A-201, Schenectady, N. Y.



Expulsion protective gaps will prevent lightning flashovers and outages on transmission lines

Special protective capacitors and station-type Thyrite arresters will protect the windings of a-c. rotating machines

Distribution arresters will provide virtual immunity from transformer failures, primary-fuse blowing, and service interruptions on distribution systems

Thyrite meter protectors will prevent lightning damage to watthour meters on exposed secondary circuits

330-237

GENERAL ELECTRIC

Abitibi Receiver Asked

Acting for the Hydro-Electric Power Commission of Ontario, Lewis Duncan, K. C., presented in Bankruptcy Court in Toronto last week a petition that Abitibi Electric Development Company, Ltd., Toronto, described as a subsidiary of the Abitibi Power & Paper Company, Ltd., be adjudged bankrupt and a receiving order be made in respect of assets. Strachen Johnston, K. C., acting for the company, opposed the petition and the court adjourned the hearing until June 11 with an order that the company file its notice of dispute of the commission claim by June 8. The commission put forward a claim for a total of $1,033,093 for power alleged to have been made available by the commission for the company following an agreement October 1, 1931, and for interest.

•

Young Opposes Banking Bill

A warning to the government to "do nothing and to threaten nothing more" to shake the confidence of American business men was uttered last week by Owen D. Young, chairman of the board of the General Electric Company and a director of the Federal Reserve Bank of New York, testifying before a Senate banking subcommittee on the Omnibus banking bill. Mr. Young declared the proposed legislation not only threatened to retard industrial recovery but would also mean postponement of needed banking reforms.

"The only justification that I know of for new legislation now of the character proposed," Mr. Young said, "is to centralize power and responsibility so that we can better control another boom. I venture the opinion that we have ample time for study before that power is needed."

•

President's Removal Power Curbed by Supreme Court

Maintaining that President Roosevelt exceeded his powers in dismissing the late William E. Humphrey from the Federal Trade Commission, not for the statutory "inefficiency, neglect of duty or malfeasance in office," but upon other grounds, the United States Supreme Court in a decision handed down last week held the removal illegal. The court decided that the term of Trade Commissioners was fixed by law, that they must not be removed except upon statutory reasons, and that to hold that the commissioners must continue in office "at the mere will of the President might be to thwart in large measure the very ends which Congress sought to realize by definitely fixing a term of office."

When President Roosevelt asked for his resignation Commissioner Humphrey, Republican, appointed by Calvin Coolidge and reappointed by Herbert Hoover, refused to accede to the President's request (ELECTRICAL WORLD, September 23, 1933, page 390), and he was summarily removed. In February, 1934, Mr. Humphrey died and his estate sued to collect salary due the former commissioner from October, 1933, when the President sought to remove him, down to the day of his death, February 14, 1934.

•

Illinois Strike Boosts Public Ownership Movement

Although the Illinois Power & Light Corporation has agreed to enter Governor Horner's conference to terminate the strike of its union electrical workers through arbitration of their alleged differences (ELECTRICAL WORLD, May 25, page 98), city officials in several southern Illinois communities affected have taken steps to deprive the company of its local franchise or have launched movements looking to the establishment of municipal light and power plants. At Woodriver the City Council has adopted a resolution nullifying the company's franchise for its failure to maintain uninterrupted service. The Edwardsville City Council has also voted unanimously to declare the company's franchise forfeited.

Although Mayor Remsnider has rejected a suggestion that the city of Belleville should seize the local plant of the company and restore electric service, the movement for a municipal light and power plant is gaining momentum. The suggestion that the federal government dam No. 26, now under construction at Alton, could generate enough power to supply adequately various towns and cities in Madison, Jersey and St. Clair counties has been made. Establishment of a municipal light and power and gas plant to replace Illinois Power & Light's present service is asked in petitions being circulated for presentation to the City Council of Hillsboro. The feasibility of transmitting Muscle Shoals power has also been discussed.

•

Charter Petition Refused

Adhering to the principle that the State of Virginia cannot charter a public service corporation to operate several different kinds of services under the same articles of association, the Virginia State Corporation Commission has refused a charter petition to the Southeast Public Service Corporation. The corporation, chartered in 1931, to do a telephone and telegraph business, asked that its charter be amended to permit it also to distribute electric power, natural and artificial gas, and water. Not only would the charter be contrary to Virginia law and policy, the opinion stated, but it was also pointed out that the petition requested the right of eminent domain in Virginia without specifying where and how it intended to exercise that right.

•

Pigeon River Permit Denied

Preliminary permit to the Pigeon River Lumber Company of Minnesota for a proposed water-power project of seven dams and a power plant on Pigeon River, an international stream between Minnesota and the Province of Ontario, Canada, was denied last week by the Federal Power Commission. From 1924 to 1927 the company held a preliminary permit for a project covering five sites for dams proposed in its recent application, but did not file an application for license to construct the project before expiration of that permit.

In denying the second application, the Power Commission held that "it is contrary to the public interest to grant now a second preliminary permit, as the only purpose which could be served thereby would be to extend the period of priority of application beyond that contemplated by the statute."

Business Papers Oppose Government Competition

At the spring meeting of the Associated Business Papers, held recently at Hot Springs, Va., the following series of resolutions were formulated:

1. We are opposed to government operation of business enterprises and competition with its own citizens.

2. We are opposed to government ownership and operation of railways.

3. We believe the restriction of free enterprise and competition through a system of government licensing of processors, as proposed in amendments to the agricultural adjustment act, to be inconsistent with the interests of agriculture, business and the public.

4. We urge the elimination at the earliest possible moment of all artificial brakes upon freedom of individual initiative and enterprise, because we believe that through them alone employment can be expanded and normal incentives for business development and capital investment provided.

How Liquid-filled Bushings on G-E Power Transformers Contribute to

CONTINUITY OF SERVICE -- LOW MAINTENANCE COSTS

THE liquid-filled bushings on G-E power transformers are built to meet the increasingly rigorous requirements of modern operating practices.

Because of their scientific proportions and liquid filling, they will not be injured by excess potentials, either 60-cycle or impulse.

The liquid filling prevents the formation of voids with the resulting entrapping of air. This eliminates the possibility of internal discharges under high stress, either 60-cycle or impulse, and minimizes the possibility of radio interference.

Cracks in the porcelain that may result from accident during shipment or handling are easily discovered before installation, by the most casual inspection.

The liquid-filled bushing provides the advantages of liquid and solid insulations in combination—the same combination that made possible the development of the high-voltage transformer.

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y.

310-6

GENERAL ELECTRIC

Municipal Electric Plants Receive Setbacks

Application of the city of Milwaukee for authority to build a $14,820,000 electric plant to serve the general public has been dismissed by the state Public Service Commission. The commission pointed out, however, that the city may have an unused right under three state Supreme Court decisions in 1912, 1913 and 1920 to become an electric utility without authority of the commission. The commission held that it was without jurisdiction over the present application of the city, but suggested that the city might avoid prolonged litigation by asking the Supreme Court to render a declaratory judgment on the city's status as a public utility.

St. Paul, Minn., will hold no election this year on the proposition to acquire a municipal light and power plant. Clarence Storms, chief clerk of the Bureau of Registrations, informed the Council that the petition, carrying 27,000 names, contained fewer than 8,000 legal signatures. His check showed that 5,000 of the signers were not registered voters of the city and that a large majority of the remaining signatures did not correspond with registration cards on file in his office. Under provisions of the city charter at least 20,000 registered voters are required on a petition for a special election, such as had been sought by the municipal ownership group. The rejected petition had contained a provision for purchase of the properties of the Northern States Power Company providing they could be acquired for the sum of $16,000,000.

Opponents of a proposal to construct a $1,500,000 municipal electric plant in Auburn, N. Y., were victorious in a recent referendum, winning 6,293 to 4,848. The Empire Gas & Electric Company serves the city.

Application by the city of Fort Worth, Tex., for a $2,228,000 P.W.A. loan and grant for construction of a municipal light and power plant has finally been denied at Washington. The project was found economically unsound. The application had previously been disapproved, but was resubmitted.

•

Commonwealth Edison Starts A.C. Network in Chicago

Construction work was started recently by the Commonwealth Edison Company on an alternating current network distribution system in the area immediately south of Chicago's loop. This installation will be the first of its kind in the city although networks had been installed in a few large buildings. In the network project now in construction, which covers the area bounded by State Street and Wabash Avenue and Van Buren and Eighth Streets, transformer vaults will be located under the sidewalks near street intersections. They will be supplied by 12,000-volt feeders and will be solidly interconnected by means of secondary mains beneath the streets. These secondary mains will provide four-wire, three-phase, 120-208-volt service to customers. The initial system will consist of seven transformer installations interconnected by about 10,000 ft. of secondary mains and will provide capacity for approximately 2,000 kw. of load, which will be cut over from the present direct-current system.

•

City Plants Tax Fought

In an effort to resist payment of property taxes on municipal utility plants at Anderson, Ind., which will be approximately $15,000 a year, Mayor Harry R. Baldwin has instructed the city legal department to prepare a suit seeking to enjoin the tax-collecting officials from acting. The proposed taxation will be resisted on the grounds that municipal plants should not be taxed in distinction to other government property. The state law requiring payment of property taxes by municipal utility plants was enacted two years ago, but collections were not authorized until this year.

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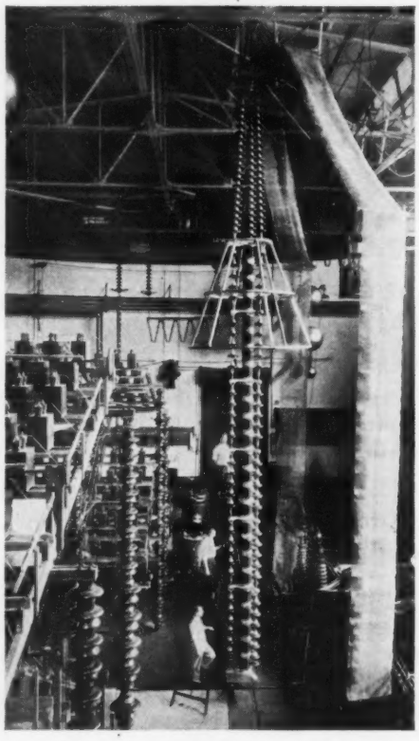
FOR THE DEFENSE OF BOULDER DAM



The first of twelve giant Thyrite lightning arresters built by General Electric Company to protect the Boulder Dam transmission lines from lightning. Rated at 287,000 volts, the arrester is 45 ft. high and weighs 4,500 lb.

Northwest Group Stresses Operating Efficiency

Use of existing plants at a higher degree of efficiency was the keynote of the twelfth annual general meeting of the Engineering and Operation Section, Northwest Electric Light & Power Association, at Seattle, Wash., May 9 to 11. This keynote was sounded by L. R. Coffin, vice-president Puget Sound Power & Light Company, who welcomed the delegates as president of the association, and many of the papers and discussions pointed toward this objective. More than 150 engineers attended.

Aside from the papers and reports presented by the four technical committees, an inspirational address was made by L. T. Merwin, vice-president Northwestern Electric Company, in which the fundamental premises on which the electrical industry is based were codified. Outlining the characteristics of the utility business responsible for its growth through private initiative, he defined the extent to which the federal government might legitimately enter the field as being to dispose of such power as might be made available as a necessary concomitant part of some large program involving irrigation, navigation, flood control or soil erosion.

Among operating problems in the production and generation field discussed, E. H. Collins, Washington Water Power Company, propounded the equation "Inspection Plus Maintenance Equals Service," showing by curves that as the cost of maintenance and operation was reduced, the total hours of interruptions went up.

Transmission and distribution engineers were interested in methods developed by member companies for checking the loading on distribution transformers as summarized by M. T. Crawford, Puget Sound Power & Light Company.

Load building program

In the utilization committee paramount interest centered on the report on "Electric House Heating," by John Bankus, Portland General Electric Company, giving comparative cost figures of electric heat with other types of fuel heating.

A simple installation for winter auxiliary and summer off-peak electric hot water service was described by S. B. Clark, Northwestern Electric Company, while some technical developments in the illumination field, described by F. H. Murphy, Portland General Electric Company, completed the load building part of the utilization program.

At an executive committee meeting held between sessions the following were named to head the section activities for the coming year: J. Hellenthal, Puget Sound Power & Light Company, chairman; T. A. Purton, Idaho Power Company, vice-chairman.

Look to Your METERS for MAXIMUM Benefit from "BETTER LIGHT—BETTER SIGHT"

IN the last ten years, you have probably more than doubled your domestic load. Today, it has reached a new peak.

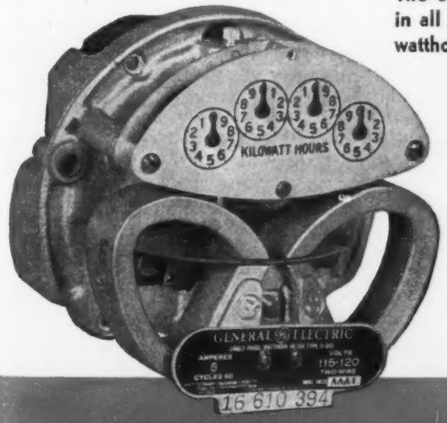
And conditions point to a further increase. "Better Light — Better Sight" and other load-building campaigns are constantly increasing the demand for power.

To obtain maximum benefit from these added loads —look to your meters. They must register accurately.

Consider This Situation

The number of your customers has not gone up in proportion to the increase in power consumed. This means that you have placed greater loads on individual meters.

However, the watthour meter of 1915—or even 1925 —was not designed for such loads. Under present conditions its use may cause loss of revenue.



The element now used in all G-E single-phase watthour meters. It can be furnished in several different forms of housings

What, then, of the future? Only modern meters can yield the proper returns from most of your residential customers during the coming decade.

The Modern G-E Meters

Eight years ago, General Electric introduced a new line of watthour meters—with the now well-known Type I-16 element. Millions were installed, and their service records testify to their permanent, long-range accuracy.

Today, General Electric offers a line of watthour meters with the same fundamental design, but with added features to fit them to meet new conditions.

They are known as Types I-20-A, I-20-B, I-20-C, and I-20-S. They differ only in the methods of housing to suit the various conditions of installations and to give complete protection.

They have practically straight-line accuracy up to 300-per-cent load—a feature which insures correct registration from light loads to the heavy loads taken by present-day residential consumers.

A Sound Investment

When all factors are considered, a systematic program for the retirement of obsolete watthour meters usually proves a sound investment.

You may want to continue your investigations to determine just what such retirement will mean to your system. In this work our meter specialists will be able materially to assist you. Address the nearest G-E sales office, or General Electric, Schenectady, New York.

GENERAL ELECTRIC

400-11

MEN OF THE INDUSTRY

James Burke Retires to Engage in Research

James Burke, inventor and electrical engineer, has retired from the Burke Electric Company, Erie, Pa., to devote his energies to engineering research and confine his activities to an advisory capacity in the electrical manufacturing industry. At the annual meeting of the stockholders of the company, held last week, Mr. Burke asked to be relieved of the responsibilities of chairman of the board and directorship, after having been active head of the company continuously for more than thirty years.

During fifteen years as an electrical designer in this country and abroad, prior to establishing in 1904 the Burke Electric Company, his inventive ability received international recognition. The patents granted to him for the design of a generator winding by which three-wire service was made possible from a single machine and his "universal" motor operating on both direct-current and alternating-current circuits had far-reaching effects on the expansion of electric service. The influence he wielded in the affairs of the Electric Power Club, of which he was president for two terms, and in matters of electric standardization here and abroad was profound.

Mr. Burke is a fellow of the American Institute of Electrical Engineers, a member of the American Society of Mechanical Engineers, a charter member of the American Welding Society and an Edison Pioneer. He will sail for Europe this month to attend a conference at The Hague, of the International Electrotechnical Commission as one of the United States delegates.

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▶ JOHN R. GILBERT, who has been with the Nevada-California Electric Corporation for thirteen years, has been named its secretary, filling the office made vacant by the death of W. S. Fisher.

▶ V. L. HOLLISTER, for a number of years connected with the University of Nebraska engineering staff, has been named engineer for the Nebraska State Railway Commission, to succeed the late B. E. Forbes.

▶ E. K. MURRAY, director of the Department of Public Works of the State of Washington, has resigned to re-enter private practice. Prior to his appointment as director he was city attorney in Tacoma and a member of a firm which had an extensive private practice. He now returns to this organization. As director Mr. Murray devoted himself to regulatory work with enthusiasm. The rate schedules of most of the public utilities of the state were reviewed and revised during his term of office. He was active in the work of the National Association of Railroad and Utilities Commissioners and during the current year was appointed a member of the executive committee.

•

A. V. Grief Elected Public Utility Executive

A. V. Grief, widely known in automotive financial circles, has been elected vice-president, secretary and treasurer of the Gary Heat, Light & Water Company,

A. V. Grief

Gary, Ind. Mr. Grief went to Gary in April as financial adviser to A. C. Colby, president of the utility company. Mr. Grief was formerly with the Industrial Acceptance Corporation in South Bend and later in New York. Subsequently he joined the Pierce-Arrow Sales Corporation in New York, serving first as its vice-president and treasurer and then as assistant to the president of the Pierce-Arrow Company, with headquarters in Buffalo, the position from which he resigned to join the Gary utility.

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▶ C. H. HOWELL, special representative and power rate expert of the Virginia State Corporation Commission, has resigned.

▶ FRED L. HOUGH, design engineer of the mechanical engineering department of the Brooklyn Edison Company, has retired because of poor health. Mr. Hough has been with the Brooklyn Edison Company for almost twenty-three years, except for a period of five months during which he was with the New York Edison Company.

▶ HAROLD C. HAMILTON, superintendent of the department of standardization and testing, Boston Edison Company, has been elected chairman of the Boston section of the American Institute of Electric Engineers for the coming year.

▶ WILLARD ALLPHIN, formerly illuminating engineer for the Fall River (Mass.) Electric Light Company and for the past six years heating sales engineer of the Lawrence (Mass.) Gas & Electric Company, has jointed the lighting sales staff of the Cambridge (Mass.) Electric Light Company.

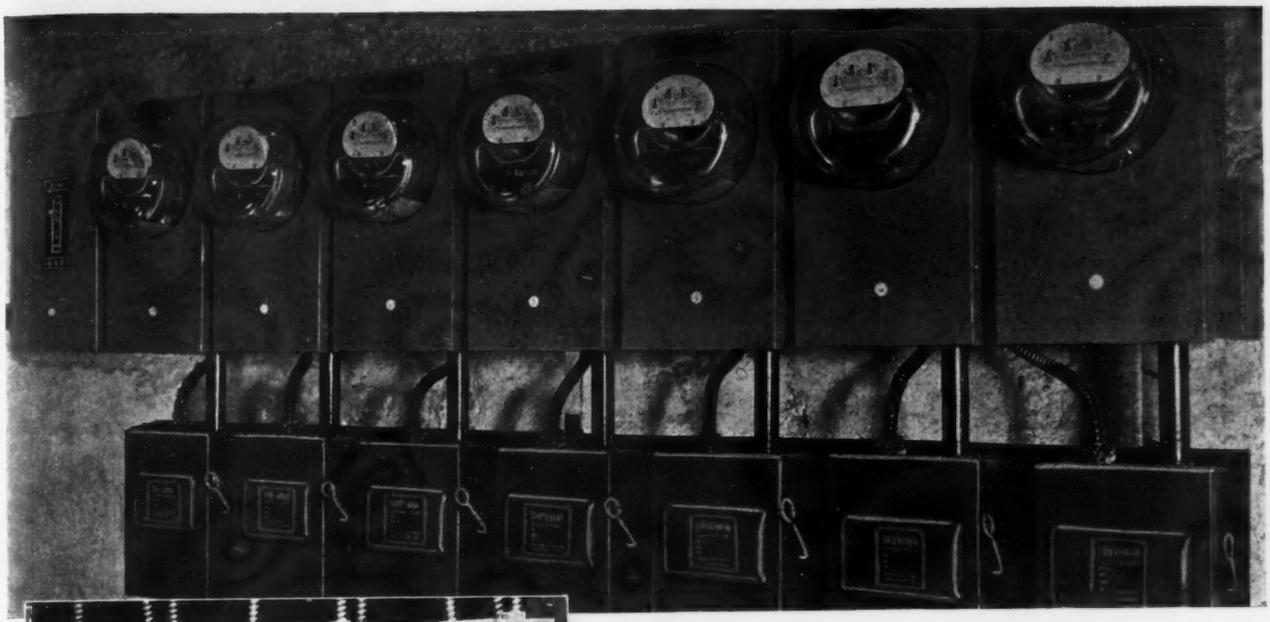
▶ T. M. KEILLER, superintendent of distribution of the El Paso Electric Company for the past year, has been appointed to a similar position with the Navasota division of the Gulf States Utilities Company. Mr. Keiller has been connected with companies in the Stone & Webster group since 1922.

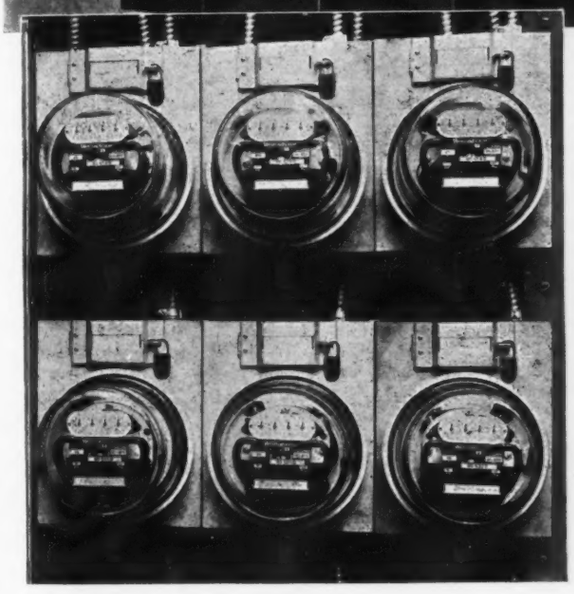
▶ REAR ADMIRAL HAROLD G. BOWEN assumed the office of chief of the Bureau of Engineering of the Navy Department last week. He relieved Rear Admiral Samuel M. Robinson, who has been ordered to duty with the General Electric Company at Schenectady, N. Y., as inspector of naval material.

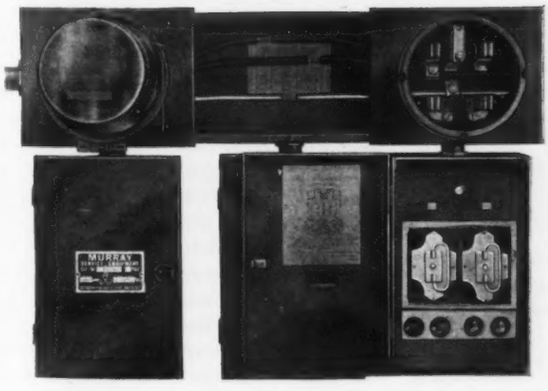
▶ FRANCIS K. GODWIN, for the past five years division manager and advertising manager of the Oklahoma Utilities Company at Fairfax, has been transferred to Hominy to succeed O. D. Parker as superintendent of electrical operations of the company, continuing in charge of advertising. Mr. Parker, who has been in Hominy for three years, has assumed new duties in Ohio.

▶ G. A. JERNIGAN, formerly superintendent of ditstribution for the Gulf States Utilities Company, Lake Charles, La., is now occupying a similar position with the El Paso Electric Company. Mr. Jernigan has had extensive practical experience, his association with public service companies dating back many years. From 1927 to the time of his recent assignment he had been at Lake Charles.

▶ DR. HERBERT E. IVES, prominent rerearch authority on illumination, color photography and television at the Bell Telephone Laboratories, Inc., New York City, has been appointed a fellow for research in color science at the Fogg Art







NOW A NEW AND PROVED WAY TO STOP CURRENT DIVERSION

Current diversion cannot be eliminated by half-way methods.

Murray Meter Enclosures unquestionably guard against unauthorized use of current.

One type is supplied for use of new or old type meters—can be installed either indoors or outdoors. The other two types are built for installation of plug-in type meters only.

The effectiveness of each type has been proved in actual conditions.

We have prepared a booklet entitled "35 Years of Meter Service Progress" in which there is a description of the meter enclosures.

Why not send for a copy—there's a coupon for covenience.

METROPOLITAN DEVICE CORPORATION
Brooklyn, New York

Gentlemen:—Send booklet "35 Years of Meter Service Progress"—also catalog of Murray Switches.

Name..... **Title**.....

Company..... **Address**.....

MURRAY METER ENCLOSURES

Museum of Harvard University in Cambridge, Mass., beginning in September. He was formerly in charge of experimental work in airplane photography for the aviation section of the U. S. Signal Corps and is widely known for his inventions of apparatus for testing visual acuity and photometric values. He is the holder of the John Scott Medal for pioneer work in electrical telephotography and television.

▶ ROBERT E. ARNOLD has been appointed sales manager of the Silex Company, Hartford, Conn.

▶ F. W. MARDOCK has been appointed apparatus sales engineer of the English Electric Company of Canada, Ltd., St. Catherines, Ont.

▶ H. C. FISKE, formerly assistant chief engineer of the James R. Kearney Corporation, St. Louis, Mo., is now with J. E. Sumpter Company, consulting engineers, Minneapolis, Minn.

▶ DR. H. L. HAZEN of the Massachusetts Institute of Technology, has been awarded the Levy medal given yearly to the author of a contribution of special excellence to the Journal of the Franklin Institute. Dr. Hazen published two papers on the theory of remote control of apparatus by electrical devices.

▶ EDMUND K. MURRAY, formerly a construction engineering executive with the Stone & Webster Engineering Corporation and later with Dwight P. Robinson & Company and United Engineers & Constructors, has been appointed plant superintendent for Edgar P. Lewis & Sons, Inc., confectionery manufacturers, Malden, Mass. Mr. Murray is widely known in electric power plant construction circles in both industrial and utility fields.

▶ R. T. PIERSON was elected vice-president and general manager of the USL Battery Corporation following the resignation of A. A. MacLean. Mr. Pierson has been connected with the company as manager of the power battery division. He brings to his new position a wealth of executive experience, having previously served as vice-president of the General Cable Corporation, president and treasurer of the Bremer-Tully Manufacturing Company and president and treasurer of the Hazeltine Corporation.

▶ C. B. NOLTE has been elected president of the Crane Company, Chicago, and J. B. BERRYMAN, who had been president since 1931 and who has been connected with the Crane organization since 1892, has become chairman of the board. Since 1909 Mr. Nolte has been with the Robert W. Hunt Company, consulting, testing and inspecting engineers, serving successively as division manager, manager, vice-president and general manager and president and general manager, the position he held until he was elected to his new office. Mr. Nolte is a member of the American Society of Mechanical Engineers, American Society of Civil Engineers, American Society for Testing Materials, Western Society of Engineers and of other technical societies.

▶ WILLIAM E. TAYLOR has been appointed general sales manager of the Kenyon Transformer Company, Inc., New York.

▶ ELLERY L. WILSON, general superintendent of the Rumford Chemical Works, Rumford, R. I., has been elected president of the Providence Engineering Society for the year beginning July 1, succeeding Ernest F. Walsh of the Narragansett Electric Company.

▶ W. R. THORSON of Kansas City, Mo., has been named superintendent of the municipal light and power plant at Muscatine, Iowa, to succeed J. E. Tuttle, who has resigned after ten years of service. Mr. Thorson was formerly identified with Burns & McDonnell, consulting engineers.

▶ SAMUEL G. ALLEN has been elected chairman of the executive committee of the Superheater Company. GEORGE L. BOURNE and FREDERIC A. SCHAFF were also appointed members of that committee, and THOMAS F. MORRIS was elected secretary and assistant treasurer of the company.

▶ W. M. DEWITT has been appointed manager of the domestic advertising and sales promotion department of Kelvinator Corporation. For the past four years a Kelvinator district manager, Mr. DeWitt since 1925 has been active in electrical appliance merchandising in the south and east.

▶ EDWARD P. BAILEY, JR., has opened an office in Cleveland as air-conditioning consultant. Mr. Bailey was formerly identified with the Bryant Heater Company, Cleveland, as vice-president in charge of operations. Earlier connections included the Peoples Gas Light & Coke Company and the National Radiator Corporation.

▶ WILLIAM E. O'BRIEN, who has represented the McGraw Electric Company, Waters-Genter division, in Philadelphia and surrounding territory since January, 1934, has been appointed assistant sales manager with headquarters in Minneapolis.

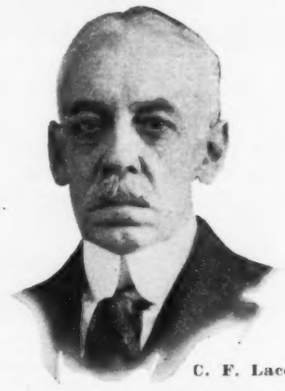
▶ M. L. ECKMAN, formerly engineer for the Federal Machine & Welding Company and for many years prominently associated with the welding industry, has been chosen to head the research and development department of the Thomson-Gibb Electric Welding Company with headquarters at Lynn, Mass.

OBITUARY

Charles F. Lacombe

Charles F. Lacombe, consulting engineer of New York, pioneer in promotional rates and builder of some of the first long-distance electric power transmission plants in the United States, died, of heart disease, May 26 at Babylon, Long Island. He would have been 68 years old the day following his death.

A native of New York and a graduate of Columbia University, Mr. Lacombe spent many years in the West engaged in engineering and mining work. It was as president of the Contracting & Selling Company, an agent for the Westinghouse Electric & Manufacturing Company and the Western Electric Company, that he installed electric lighting and power plants and built some of the first long-distance electric power transmission plants in the country. From 1903 to 1915 he was chief engineer of light and power for the City of New York, having charge of all electrical and gas work and contracts in connection therewith.



C. F. Lacombe

After leaving the employ of New York City in 1915, Mr. Lacombe specialized for several years as a consultant in rate cases and street lighting. Having entered military service in 1917, he was assigned in 1918 to the power section of the War Industries Board in Washington, with the rank of Major, and was made executive assistant to the Power Director of the United States. In 1920 he wrote the widely publicized report of the National Electric Light Association on the electrical resources of the nation. The next year he became director of economics and statistics for the Brooklyn Edison Company, a position which he held for the next six years. At the time of his death he was associated with William S. Leffler in a consulting practice with headquarters in New York. He was a pioneer and leader in the development of promotional rates. Mr. Lacombe was a fellow of the American Institute

of Electrical Engineers and a member of the American Society of Mechanical Engineers, the Illuminating Engineering Society and of other technical associations.

▶ EDWARD A. COLBY, who devised an induction electric furnace in 1887, the principle of which is the foundation of the electric steel melting industry of the United States, died June 2, of heart disease, at his home in Maplewood, N. J. He received a medal from the Franklin Institute of Philadelphia for his furnace. Mr. Colby was 78 years old and retired in 1930 after thirty years as chief engineer and superintendent of the Baker Platinum Works in Newark. He retained the office of secretary of the company and was its consulting engineer at the time of his death. As engineer for the United States Lighting Company of New York he installed the first incandescent lights on Hudson River ferryboats and also installed trolley and electric lighting systems in several cities.

▶ ORVILLE H. ENSIGN, one of the pioneers in long-distance power transmission, died June 1 in Pasadena, California, in his seventy-third year. Mr. Ensign became interested in electrical power development on the West Coast and joined the Redlands Electric Light & Power Company as consulting engineer, after working as test chief in the General Electric plant in Schenectady, N. Y. In 1897, as superintendent and chief engineer of the Southern California Power Company, Mr. Ensign built the first successful 30,000-volt long-distance transmission line, running from Redlands to Los Angeles, a distance of 83 miles. When the Southern California merged into the Edison Electric Company of Los Angeles, Mr. Ensign became superintendent and chief mechanical and electrical engineer. At the time of his death he was a consulting engineer for the United States Reclamation Service.

▶ I. REID CARLISLE, JR., manager of the Suffolk, Va., division of the Virginia Electric & Power Company, died May 28 in a Norfolk hospital. Mr. Carlisle had been identified with the Virginia utility since 1930, when he was appointed assistant to the president. Two years later he was assigned to the Suffolk division. Formerly he was connected with the Stone & Webster interests in Beaumont, Tex.

▶ CHARLES J. DAVIDSON, formerly chief engineer and superintendent of power plants for the Milwaukee Electric Railway & Light Company, died May 26 at his home in Milwaukee after a long illness. Mr. Davidson was chief engineer of the Milwaukee utility for many years and when the late John I. Beggs placed the power plants under a separate division Mr. Davidson was made superintendent. He designed the company's Commerce Street power house and super-

UNIFORMITY

IS THE OUTSTANDING CHARACTERISTIC OF
"SA" SERIES BRUSHES
FOR HEAVY DUTY D. C. SERVICE

In addition to the regular trade marks — the Three Pyramids, the Silver Strand Cable and the Grade Number — these new grades are further identified by the Double Engraved Lines (Trade Mark Registered) down the center of the brush.

THE exceptional uniformity of "SA" Series brushes—uniformity in performance as well as in physical properties—marks a definite advance in brush manufacture. It eliminates the brush variable from machine performance.

These new electro-graphitic brushes, SA-25, SA-30, SA-35, SA-40, and SA-45, are progressively graded in commutating properties and cover a wide range of application on heavy duty equipment.

Write for specific recommendation for your heavy duty D.C. service.

NATIONAL CARBON COMPANY, INC.
Carbon Sales Division, Cleveland, Ohio
Unit of Union Carbide and Carbon Corporation
Branch Sales Offices: New York, Pittsburgh, Chicago, San Francisco

14 RECORDS IN 1

A shortcut in handling applications and service orders that reduces errors 98%

● WHEN a customer takes time out on a busy moving day to apply for service at his new address, he is in no mood to be kept waiting. This is the time when he most appreciates quick, intelligent service . . . is most irritated by unnecessary questions. A lack of essential information on the part of your clerks may make him wonder how well you know your business.

Delays and Errors Impossible with Customer Service Record

Whether he phones or comes in, the customer is never kept waiting even during rush periods when a Remington Rand Customer Service Record is in use. In actual experience, the time of handling applications to connect or disconnect service is reduced from 60% to 80%. Errors are reduced at least 98%. And apart from the ever-increasing necessity of keeping your customers happy, this simplified Kardex record can bring your company at least twelve other important benefits.

1. *Fourteen records in one.* A permanent card is provided for every location containing complete information covering description of premises, kind of service available and size of meter. This card serves as both the application and the actual field service order for connecting and disconnecting four customers at each location . . . operations that would normally require sixteen separate transcriptions. In addition, a positive record control is provided on every movement of this card.

So completely does this record eliminate duplication that some utilities have found it replaces as many as fourteen separate records and files.

2. *Eliminates writing and filing applications.*

3. *Eliminates writing and filing of service orders.*

4. *Reduces errors 98%.* No chance for incorrect transcriptions, lost or misfiled records, or unnecessary handling. Every department affected works from the original record.

5. *Simplifies order procedure.* And all related operations are speeded up because the complete files and records are combined in one place.

6. *Reduces clerical expense.* The Customer Service Record brings big savings in clerical operating cost in the Application, Bookkeeping, Service and Filing Departments.

7. *Cost of forms and stationery* is reduced at least 75%.

8. *Control of inactive meters.* The record provides a positive control on all inactive meters, thus reducing the idle meter inventory without the use of auxiliary records and controls.

9. *Control on meter-testing.* Provides due date testing control saving 15% over district testing method; levels out usual peak loads of clerical work and eliminates all auxiliary records or files.

10. *Control of non-payment cutoffs.* The record provides a positive control on all services disconnected for non-payment, and

WHICH OF THESE PROBLEMS WORRIES YOU?

1. How to be sure new business does not cost more than it's worth.
2. How to make appliance and saturation records sell merchandise.
3. How to avoid shortages, and increase turn-over of appliance stock.
4. How to control material and supplies stock to increase turnover and decrease inventory.
5. How to have complete analyses of labor and material charges by operating and capital investment accounts . . . yet save clerical time.
6. How to service customers in one-third the time . . . and eliminate writing orders.
7. How to cut billing and bookkeeping costs without sacrifice of records.

eliminates possibility of re-connecting service for the same customer under another name.

11. *Fixes complete responsibility*, giving you positive control on all activities.

12. *Speeds up service to the customers* . . . builds and maintains goodwill.

Pays for itself in direct savings

Usually the direct tangible savings are sufficient to pay the entire cost of equipment and installation in about a year. Present routine is not interrupted. Remington Rand maintains a staff of experienced professional supervisors to guarantee that your installation is complete and accurate in every detail. As a direct result of this service, your installation costs are greatly reduced, your personnel selected and trained, your operating procedure organized and manual prepared . . . all without disturbing your present routine.

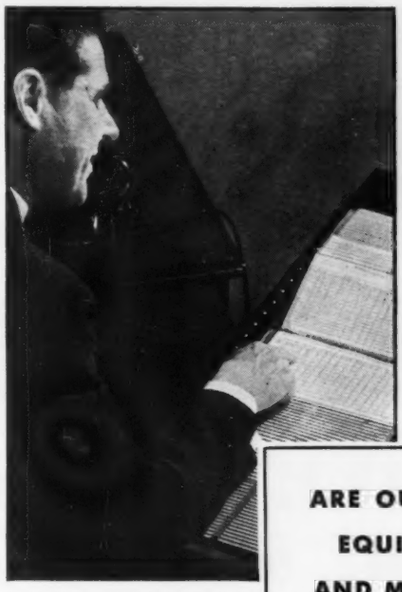
One of many Remington Rand services

The Customer Service Record is only one of the services which Remington Rand offers. The biggest service of all is the fact that Remington Rand can be impartial and unbiased in its application and advice because it makes all types and kinds of office equipment. Worn-out or out-of-date equipment . . . even though written off . . . can be a source of great waste. Phone the Remington Rand man in your city today . . . or, write Public Utility Department, Remington Rand Inc., Buffalo, N. Y.

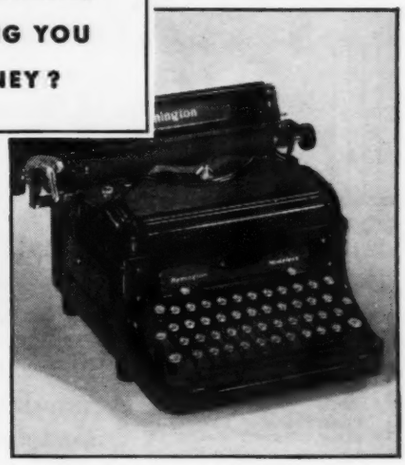
Some of the Remington Rand products saving money for utilities

NEW KARDEX on wheels permits inventory, production, sales and service expense records to be wheeled instantly to executives' desks for analysis or dictation . . . then wheeled back to posting clerks' desks. At night, valuable records can be wheeled into the vault for safe keeping.

POWERS PUNCHED CARDS will record 90 columns of salient facts covering all phases of utility management control . . . gives executives quick, accurate analyses as a no-cost by-product of routine accounting. No capital investment needed . . . Powers machines are leased, not sold.



ARE OUTWORN EQUIPMENT AND METHODS COSTING YOU MONEY?



REMINGTON ACCOUNTING MACHINE . . . The new completely electrified Remington Accounting Machine brings new speed and accuracy to customer billing, payrolls, accounts payable, departmental distributions. Cuts posting costs 10% to 50%. Compare this with your present methods.

UNLESS YOU HAVE SEEN and *heard* the new Remington Noiseless typewriter you have no idea how much it means in increased office efficiency. 23 important mechanical improvements produce better looking letters, more and better carbon copies, cleaner, sharper stencils. Ask for free trial.

Ok.. it's from Remington Rand

DEPENDABLE POLES
An Essential of . . . . Economical Lines

THE initial cost of materials used in modern line construction should have little bearing on their selection. There is no economy in the use of poles subject to rapid deterioration which will require replacement of individual poles at an early date.

Sufficient service records have been accumulated to prove the long life and dependability of AmCreCo poles and to eliminate all chance in their selection. The qualities which assure such economical service are listed here. In specifying AmCreCo poles you are placing dependence in an organization which for more than 30 years has been the leader in its industry.

Why AmCreCo Poles Have Maximum Quality

1. Select southern yellow pine.
2. Incipient decay avoided.
3. Framing before treatment.
4. Preservative of known value.
5. Adequate single treatment.
6. Treatment accurately timed to proper seasoning.
7. Full length pressure treated.
8. Unequalled facilities and personnel of the leading producer.

AMERICAN CREOSOTING COMPANY
INCORPORATED
COLONIAL CREOSOTING COMPANY INCORPORATED
AMCRECO
GEORGIA CREOSOTING COMPANY INCORPORATED
LOUISVILLE — KENTUCKY

vised the construction of the central heating system. After spending eleven years with the Milwaukee properties, Mr. Davidson joined the consulting engineering firm of Woodmansee & Davidson, Chicago, and also was associated with the Gilbert Grinder Company, Milwaukee. He retired from active work five years ago because of ill health. Mr. Davidson was born in Lanesboro, Minn., 67 years ago.

▶ RALPH S. STEFFENS, manager of the Electrical Association of Chicago, died May 10.

▶ DR. ALFRED E. BURTON, first dean of the Massachusetts Institute of Technology and incumbent of that office from 1902 to 1920, died at Gloucester, Mass., May 11, at the age of 78.

▶ HORACE B. SWEET, consulting engineer of Utica, N. Y., died at his home in that city April 7 in his sixty-fifth year. Mr. Sweet was the designer of the electrical equipment of the Trenton Falls, N. Y., plant of the Utica Gas & Electric Company and had also designed many electrical power plants in various parts of the country. He was a graduate of Cornell University.

▶ EMIL H. HUENEFELD, 58, for fifteen years manager of the Gas & Electric Appliance Company stores, merchandise sales outlets of the Union Gas & Electric Company, Cincinnati, Ohio, died in his home May 5 following an illness of nearly two years. Long regarded as one of the most clever merchandisers in the utility field, Mr. Huenefeld became associated with the company after many years in the stove industry.

▶ FRED T. WRIGHT, for many years general superintendent of the Toronto (Canada) Electric Light Company prior to his return to the United States some years ago, and connected with the old Thomson-Houston Electric Company at Philadelphia in pioneer days, died at Milton, Mass., April 16 from heart failure. He was born in England 80 years ago.

▶ ERVEN J. KOWALKE, Indianapolis, rate statistician for the Public Service Company of Indiana, died recently in St. Vincent's Hospital, Indianapolis, following a brief illness. He had been connected with the company twelve years, going with it immediately following his graduation from Iowa State College.

▶ JEREMIAH SMITH, JR., noted Boston lawyer and adviser of Hungary in the post-war period, who was identified with the pioneer development of the Connecticut River Transmission Company (predecessor of the New England Power system) in interior hydro-electric plant establishment, died at his home in Cambridge, Mass., March 12, at the age of 65.

NOW YOU CAN SAY "GOODBYE"

TO PASSENGER CAR TIRES ON YOUR LIGHT TRUCKS

General gives utilities first and only real truck tire in light delivery sizes

THE experience of most utilities with tires on their light trucks in city and suburban service has been a bitter repetition of beads pulling out—sidewalls breaking down—casings bruised and broken—poor mileage and short tire life.

Why? Because only *passenger car tires* were available—until General introduced the *"Special Commercial."* And passenger car tires couldn't be expected to "take it" in truck work—to carry the loads—to stand the pounding punishment on rough roads—the bruising and scraping against curbs.

The General *"Special Commercial"* is the *only* tire of truck construction that is made to fit the rims on your light trucks—the *only* tire that will do a real *truck* tire job from a mileage standpoint. It has heavier beads, heavier fabric, more rubber between the plies and a much thicker tread.

Get the whole story of the "Special Commercial" from your General Tire dealer. He is a practical truck tire man with wide experience and accurate knowledge in fitting the right type and size of tire to *all your* trucks, no matter what their type or what they do. He has the most complete, most highly specialized line of truck tires in the business. This combination is worth real money to you.

3 REASONS WHY GENERALS ARE MORE PROFITABLE TO YOU:

1. Generals are stronger tires—additional full-width plies of powerful cord are anchored bead to bead—with no "idle" plies—no floating breaker-strips.

2. Generals are cooler tires—they flex uniformly without that heat-producing "hinging action" of ordinary breaker-strip tires.

3. Generals have "compact rubber" treads—their construction keeps the tread rubber compact and compressed so that it wears slowly and gives more miles.

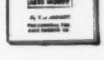
★

THE GENERAL SPECIAL COMMERCIAL

is used by many utilities on a majority of their trucks. This is only one of the complete line of Generals—each designed and built specifically to do a certain job better.

★

FREE this valuable booklet on how to get more service from your truck tires. Write The General Tire and Rubber Company, Akron, Ohio.



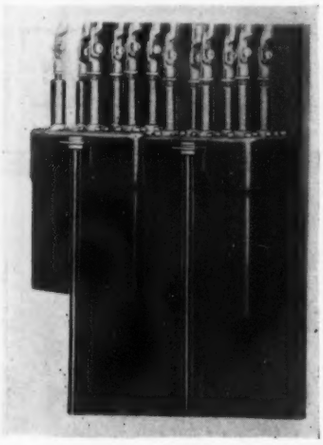
GENERAL TRUCK TIRES

★ ★ ★

NEW EQUIPMENT

Oil-Blast Breakers

Oil-blast principle of operation adopted in these panel-mount breakers increases the reliability of operation and requires 35 per cent less floor space. Silver-to-silver cur-



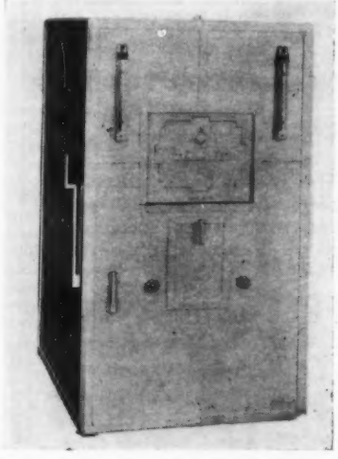
Ratings: 600 amp. at 15,000 volts, 1,200 amp. at 7,500 volts; interrupting capacity 50,000 kva.; **General Electric Company, Schenectady, N. Y.**

rent-carrying contacts prevent cumulative overheating. New type solid-butt interrupting contacts will stand thousands of operations. Any mounting such as panels, cubicles or pipe work can be used.

•

High-Temperature Furnace

A new metallic resistor is featured in this furnace which makes operation at temperatures up to 2,300 deg. F. possible. Radiant

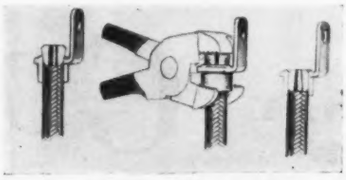


Furnace rating 21 kw. at 230 volts; radiation loss 5.5 kw. at 2,300 deg. **Hevi-Duty Electric Company, Milwaukee.**

plate and tee-support construction gives full support to the heating element and assures free release of heat. The element, which can operate in either oxidizing or reducing atmospheres, has a resistance 45 per cent greater than nickel-chromium wire and a higher current-carrying capacity.

Mechanical Lug

Firm connections are insured by the tremendous mechanical pressure exerted on the wire when the tapered wedge is forced into



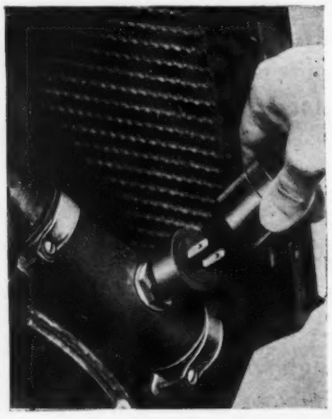
"Wedge On" terminals; for No. 4 to No. 22 wire; requires special tool. **Thomas & Betts Co., Elizabeth, N. J.**

the barrel of the lug. No solder is required. The lug will not vibrate loose.

•

Auto Engine Heater

Cold weather starting of automobiles is facilitated by this immersion heater. Installed in the lower hose connection joining



Used on 115-volt lighting circuit. **Edwin L. Wiegand Company, Pittsburgh, Pa.**

the radiator and engine it heats the cylinder water of the motor, making speedy starting in cold weather possible.

•

Luminous-Tube Transformer

Ratings: 12,000 and 15,000 volts. **General Electric Co., Schenectady**

This transformer design features low installation cost, greater continuity of service, improved operating safety and compactness.

•

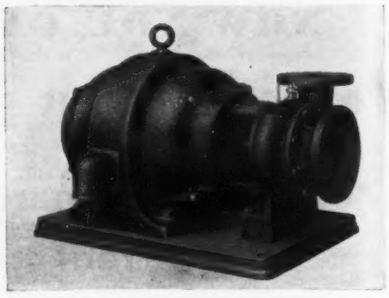
Window Ventilating Fan

Fits any size window; operates on 110 volts. **General Electric Company, Schenectady, N. Y.**

Removes smoke and cooking odors from domestic and commercial kitchens. Fitting inside the window frame, this fan permits the window to be closed in the usual way when not in use. Glass panels at either end of the frame permit free entrance of light, while a resilient motor mounting prevents vibration and eliminates noise.

Centrifugal Pumping Units

Adaptable to air conditioning, water heating, refrigeration and boiler return systems, breweries, industrial plants, etc., these units have the pump rigidly attached to the motor frame. The pump impeller is mounted directly on the motor shaft and both motor and the pump are bolted to one



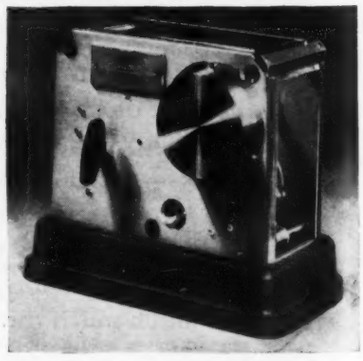
"Monobloc" sizes available 1 to 2½, 3 and 4 in.; horizontal or vertical mounting; motor splash or explosion proof. **Worthington Pump & Machinery Corporation, Harrison, N. J.**

base. Balance rings eliminate end thrust and put the stuffing box under suction pressure only.

•

Spring-Driven Relay

Used for controlling master fire-alarm boxes, operating fire-pump controls and for operating machine equipment, this selective relay provides a means for controlling the operation of one system when a timed signal is transmitted over a second system to which the relay is connected. Normally open and normally closed contacts are provided for connection in the circuit to be con-



Dimensions 4 3/16 x 7¼ x 6 3/16 in.; magnet resistance 40 ohms; contact capacity 0.5 amp. **Gamewell Co., Newton, Mass.**

trolled. Contacts for a supervisory circuit are also provided which close when the relay is run down.

•

Spinning Frame Drives

Consideration of the large number of mounting bases used for spinning frames suggested that improvements and refinements could be incorporated in a special base, for

PROTECT that New Load!

WITHOUT increasing capital investment, you can now get *better protection* than has ever before been available at any price.

Those greater residential revenues from ranges and other appliances can be protected at the substation at low cost by installing new S & C Fuses.

Return Blown Fuses Now

Just return your blown S & C Fuses and on an exchange basis, the *newest* and *latest* in improved S & C Fuses will be supplied at a cost so low that your capital investment is not appreciably affected.

Get Latest Improved Fuses

S & C Fuses of today have demonstrated their greater reliability, longer life, and lower maintenance compared to any previously built. They show fewer operations, require fewer service calls,—because they have sufficient thermal capacity to withstand momentary overloads and transients—and operate only in case of severe primary short circuit or failure of equipment.

Send for a price check-up on an exchange for your old S & C Fuses to put your substation in safe order.

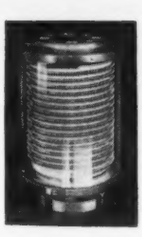
Exchange at Low Cost

See that your substations are properly protected. Gather up your obsolete and blown fuses of older designs and get the latest improved S & C Fuses on an allowance basis—which makes better protection cost you so little. Check up your power stations, list your requirements and the fuses you have available for return.

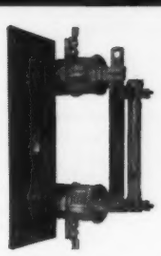
SCHWEITZER & CONRAD, INC.
4435 Ravenswood Ave., Chicago, Ill.

S & C SALES OFFICES

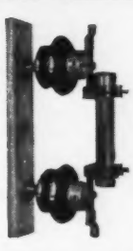
New York — Philadelphia — Boston — Buffalo — Pittsburgh — Cleveland — Birmingham — Detroit — St. Louis — Kansas City — Dallas — Denver — Minneapolis — Washington — Coral Gables — Syracuse — Los Angeles — San Francisco — Seattle — Salt Lake City — New Orleans
Also Foreign Countries



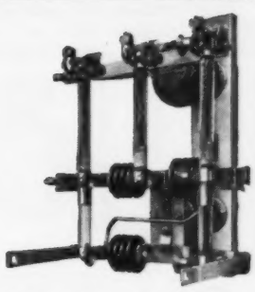
S & C Resistor for Power Transformer Station Service



S & C Fused Disconnect and Resistor for Pot. Trans. Application

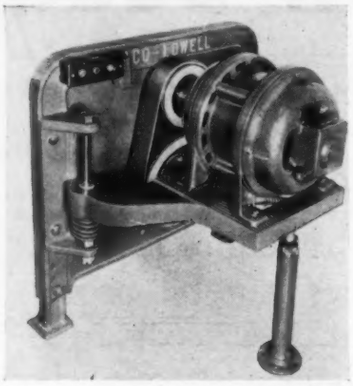


S & C Outdoor Fuse Mounting for Outdoor Substation Service



S & C Loadgard Recloser with Time Delay on Reclosing Operation for Substations and Branch Lines

this use exclusively. Three mountings were developed featuring low cost, ease of installation, dependability, high efficiency and



Mountings available: Floor, shelf or bracket, vertical. **Rockwood Manufacturing Company, Indianapolis, Ind.**

low maintenance. All three mountings are for belt drive. Constant belt tension is maintained by gravity or spring tension.

•

Drop-Out Fuse Disconnect

When the fuse of this disconnect switch blows a latch is released, allowing the switch to drop to a 60-deg. position, where it can be recognized as out of service.

Available sizes 7,500 to 69,000 volts; uses G.E. type EG-1 fuse with ratings of potential transformers and up to 200 amp. **General Electric Company, Schenectady.**

Opened manually, the switch drops to a 180-deg. position. The switch can be furnished with gas deflectors to direct gases away from other devices in its vicinity.

•

Solderless Lug

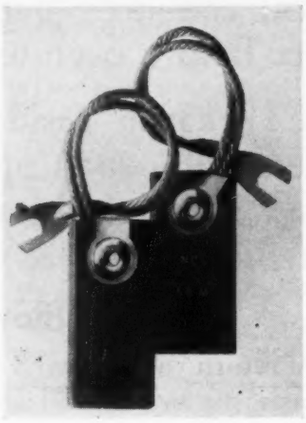
Firm contacts are assured with this lug, which features ease of installation and adaptability. A screwdriver, wrench or

Adapted to number of sizes of solid or stranded wire; large yokes available for more than one wire. **Ilsco Copper Tube & Products Inc., Cincinnati, Ohio.**

pliers can be used to install the device. A triangular clamping arrangement wedges the wire firmly in a serrated yoke.

New Brush Series

For service on heavy-duty, direct-current equipment, this series of five electrographitic brushes will make longer brush life possible by selecting the combination of characteristics best adapted to the inherent characteristics of the machine and its service. Each grade has a progressive re-



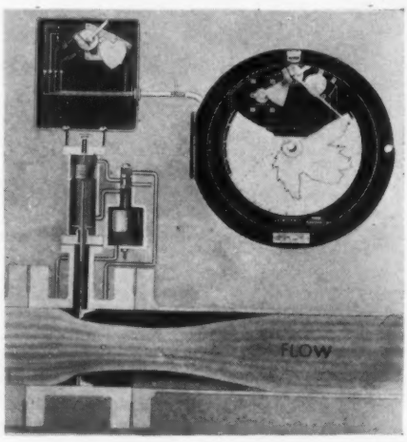
Trademark identification double engraved lines down one side of the brush; grades: S.A. 25, 30, 35, 40 and 45. **Carbon Sales Division, National Carbon Co., Cleveland, Ohio.**

lationship to the other grades with respect to commutating and mechanical characteristics.

•

Variable-Orifice Flow Meter

Fluid flow is determined, with this device, by maintaining a constant pressure drop across an orifice by varying its diameter. Changes in the orifice diameter are measured, calibrated and converted into elec-



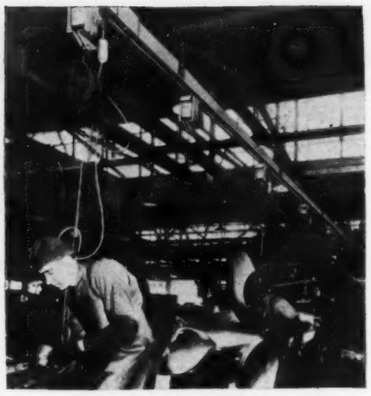
"Elgin Isometer;" measures flow of both liquids and gases. **Elgin Softener Corporation, Elgin, Ill.**

trical impulses by a time-contact device. These impulses are registered on remotely located indicating, recording or totalizing meters. Accurate measurement of flow as low as 2½ per cent of meter capacity is possible. Pulsating flow is accurately measured with this device also.

•

Trolley Duct System

Long, unwieldy and dangerous electric cords and cables on portable electric tools used along conveyor and assembly lines are unnecessary where this system is in use. An almost entirely inclosed duct contains



Duct will support five trolleys per 10-ft. length. Switch and Panel Division, **Square D Company, Detroit, Mich.**

stationary buses along which a trolley can be moved from point to point. Collector wheels transmit current from the buses through cords to the tools in use. Numerous trolleys can be operated on the system.

ENGINEERING DATA FROM MANUFACTURERS

Bulletins and catalogs now available to engineers by manufacturers and associations

Three publications on theoretical and experimental electronics and electron-tube applications, originally published for educational institutions, have now been made available to the public, at a nominal charge, by the General Electric Company, Educational Section. "Electronics and Electron Tubes" gives, in easily understood language, the fundamentals underlying the vacuum tube and include simple experiments to illustrate these fundamentals. This publication, GET-568-A, priced at 25 cents, contains 48 pages. Two other publications, GET-566 and GET-620, deal with laboratory experiments on electron-tube theory and electron tube applications, respectively. The booklets are obtainable as a combination at 25 cents.

"Condensers for Industrial Uses," catalog No. 152, published by the Aerovox Corporation, 70 Washington Street, Brooklyn, N. Y., gives applications, features and design detail of electrolytic and oil condensers. Rating tables and useful charts, tables and formulas for selecting condensers are also given.

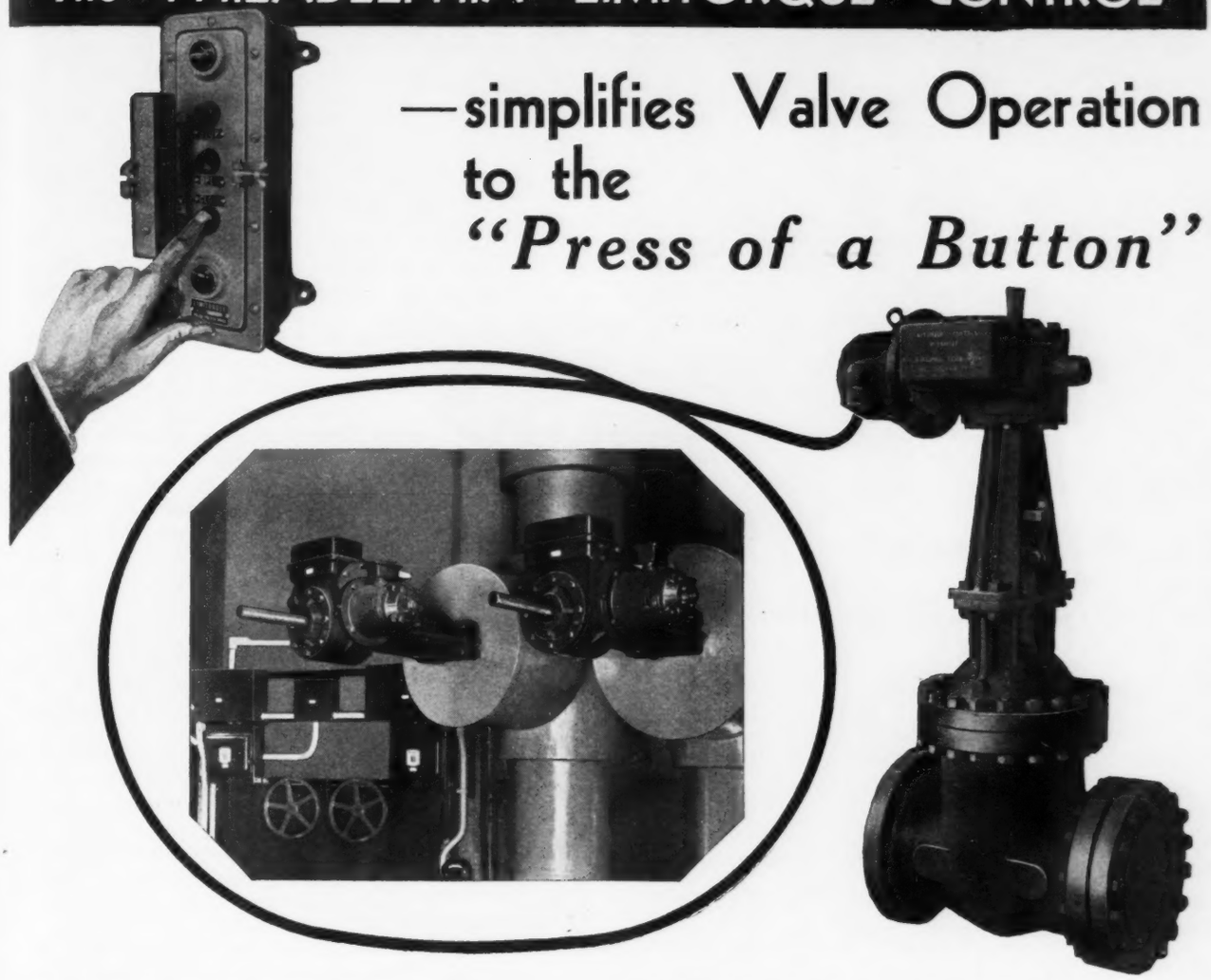
A pictorial folder of the Brown Instrument Company, Philadelphia, Pa., contains illustrations showing the applications of visual and recording instruments to various power plant problems.

Crucible Steel Company of America, 405 Lexington Avenue, New York City, has announced two bulletins describing its "Copperbond" products. One pamphlet gives specifications, dimensions and tables of weight and size for its line of copper-covered ground rods, nails and staples. A second six-page bulletin describes its "molten welding process," and test methods. Strength tables and specifications for its wire, cable and other products are given.

Applications of Hoffman heavy-duty vacuum cleaning equipment to various industrial dust removal problems are shown in a 15-page pictorial bulletin published by the Hoffman Machinery Corporation, 105 Fourth Avenue, New York City. Installation diagrams are given and recommended installation practice is illustrated.

The PHILADELPHIA LIMITORQUE CONTROL

—simplifies Valve Operation to the *"Press of a Button"*



By merely pressing a button, Valves that heretofore required one or several men to operate, now can be opened or closed in a fraction of the time it formerly took.

High Pressure Turbine Leads can be quickly closed from Turbine Gauge Board—Boilers and Turbines can be easily put into service or changed over—Boiler Feeds can be readily closed in an emergency—Intake and outlet Dampers can be actuated from boiler room Control Board—and in Hydro-Electric Plants, Penstock Valves can be controlled over telephone line from Power House—Main and Auxiliary Feeder Disconnect Switches (indoors and outdoors) can be controlled from High Board. These and numerous other emergency or normal operating conditions are easily and surely taken care of by a LIMITORQUE CONTROL SYSTEM.

As its name implies, LIMITORQUE CONTROL automatically holds to a predetermined limit the torque applied to the valve. It is compact and totally enclosed, assuring trouble-free operation.

THE PHILADELPHIA LIMITORQUE is a time-tried and proven device. In fact, over 1,000 successful installations in various lines of industry speak for themselves.

Be convinced—fill-in and mail coupon below.

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☐ Send me the LIMITORQUE Catalog. ☐ Have your Representative call on me.

Mr. _____ Title _____

Firm _____ Address _____

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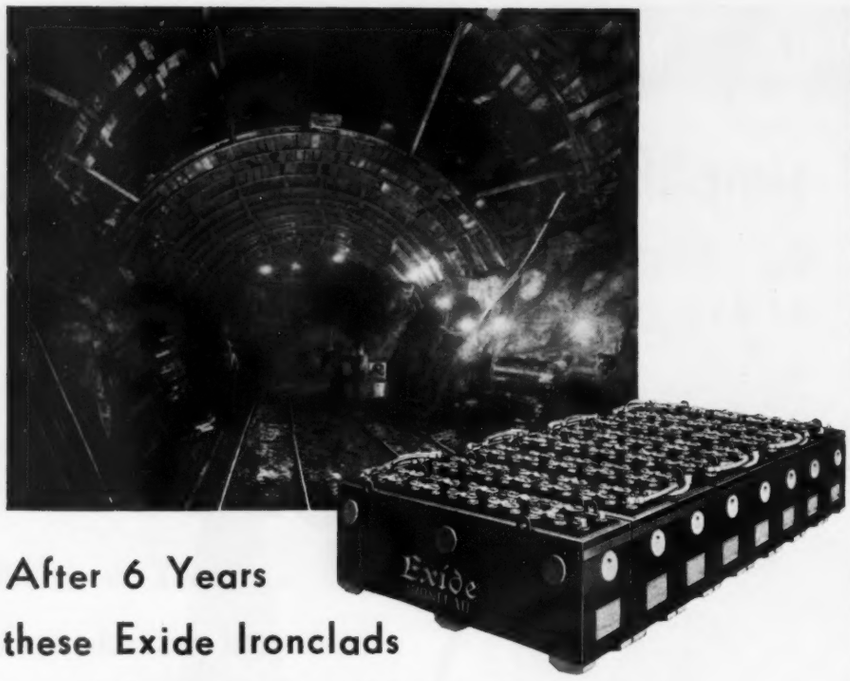


After 6 Years these Exide Ironclads are delivering 100% rated capacity

The Mid-town Hudson Tunnel, a vehicular tunnel construction project under the Hudson River, will connect Weehawken, N. J., with the heart of Manhattan. Work is proceeding rapidly on the 6000-foot shield-driven tunnel and shaft. The outside diameter is 31 feet.

Exide-equipped battery locomotives are now hauling materials, supplies and ironwork to the faces. Rapid progress, with the completion of 10 to 12 rings of tunnel daily, puts a premium on fast and uninterrupted hauling service.

The Exide-Ironclads on this job are making an unusual record for economy and long life. 16 sets of 48-cell, MVA-23 plate Exide-Ironclads were put into service on the Fulton Street Tunnel back in January, 1929, and used continuously until December, 1932. After serving on several construction jobs, these batteries were put into storage, and removed in June, 1934, to go to work on their present job. A capacity test later showed that all were still delivering 100% rated capacity.

This excellent service record is testimony not only to the value of Exide-Ironclads, but to the maintenance and care these particular batteries received. Whatever your type of work, Exide-Ironclads can improve your hauling and materials handling and cut costs. Write for illustrated booklet, "Facts for Consideration in Selecting a Storage Battery."

Exide
IRONCLAD
BATTERIES
With Exide MIPOR Separators
"MIPOR," Reg. U. S. Pat. Off.

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

Recent Rate Changes

Maryland Public Service Commission has opened public hearings to investigate the rates, valuation and other affairs of the Conowingo Power Company. The reproduction cost of the company, a prime factor in determining what rates the company will charge its customers, was set at $1,109,581 by Paul L. Holland, chief engineer of the commission. His estimate was larger than the company's original figure, but the company added refinancing costs to its estimate, raising it finally to $1,165,992, or $56,411 higher than the chief engineer's. Charles W. Smith, chief auditor for the commission, testified at the hearing that the Northern Maryland Power Company, which merged with the Conowingo company in 1931, had offered an appraisal which he believed to have been "grossly inflated." The joint hearing of Maryland and Pennsylvania commissions with the Federal Power Commission to determine the fair original costs on the Conowingo development, scheduled for June 4, has been postponed until the fall.

•

Jersey Central Power & Light Company has been ordered by the New Jersey Board of Public Utility Commissioners to reduce its electric rates $361,446, or approximately 11½ per cent. At least 80 per cent of the reduction is to accrue to the domestic users.

•

New Jersey Board of Public Utility Commissioners also announced reductions in the electric rates of the Rockland Electric Company and the Orange & Rockland Electric Company, both subsidiaries of New York State companies, operating in Bergen and Passaic Counties. The reduction of the Rockland company, effective on bills sent beginning July 1, will be $30,000 annually. That of the Orange & Rockland company, which was effective on bills June 1, will be $3,000 annually.

•

Old Dominion Power Company has been ordered by the Virginia State Corporation Commission to reduce its rates $65,000. The order brought to a close a case which has occupied the attention of the commission for nearly three years. The slash was made upon the complaint of the Virginia Coal Operators' Association, representing mining interests in the southwest Virginia territory the company serves. While the coal operators asked for a reduction of 30 per cent, the cut ordered by the commission will amount to only about 13 per cent annually. The commission expressed the opinion that the reduction should cut approximately $55,000 from the bill of coal mining customers and $10,000 from that of domestic consumers. The order, climaxing a campaign for lower power rates in

PARKWAY CABLES

OUTSIDE of the United States, buried cables are as common as conduit lines are here. Notwithstanding this, the trend is definitely toward the former. **The American Steel & Wire Company** has blazed the trail with its installation of 44KV "parkway" cable and the hundreds of installations of non-leaded submarine cable. For the "perfect" non metallic sheathed buried cable ask for a sample of our **Triple "L"**. If unusual mechanical protection is required, specify **"Armorlokt"** or standard metallic finishes.

AMERICAN STEEL & WIRE COMPANY

208 S. LA SALLE STREET, CHICAGO • • • EMPIRE STATE BUILDING, NEW YORK

Pacific Coast Distributors: Columbia Steel Company, Russ Building, San Francisco

Offices in All Principal Cities

Export Distributors: United States Steel Products Company, New York

United States Steel Corporation Subsidiary

Virginia, which has clipped $800,000 from the annual electricity bill of the state consumers, was the first mandatory reduction, slashes enforced on other Virginia utilities having been reached through negotiation.

•

Missouri Power & Light Company has been ordered by the State Public Service Commission to file by July 1 new rural rates for territory adjacent to 140 towns in north Missouri. The new rates average from 10 to 30 per cent reductions in present rates, depending on the energy used. Only 2 per cent of the electrical energy sold by the company is consumed by rural patrons, J. C. Collet, chairman of the commission, stated. The cut is the first step in the commission's statewide program to slash rural electric rates to promote an extensive electrification of the farming areas.

•

Portables Specifications Revised by I. E. S.

Revisions in the specifications for certified portable lamps, making for more flexibility in design, have been announced by the Illuminating Engineering Society. Chief among the revisions concerns the reading and study lamp, original of the certified portables. Designed first for a 100-watt "Mazda" lamp, it may now be altered to use a 50-100-150-watt three-light lamp which Mazda manufacturers expect to have available this month. A revision of special interest to portable lamp manufacturers is a lower minimum height for semi-indirect and indirect floor models as the present lamps are considered by some users too tall for most living rooms. Requirements for material quality and dimensional precision are made less severe. Standards set in original specifications are maintained and in no way are lamps already certified affected.

•

Insulator Company Formed

Announcement has been made of the formation of Victor Insulators, Inc., with headquarters in Victor, N. Y. The new organization has purchased the plant formerly operated by the Locke Insulator Corporation and will start production in the near future. The officers, all of whom have had extensive experience in the insulator field, include: Bentley A. Plimpton, president and treasurer; Arthur G. Benard, vice-president; George H. Schoenthaler, secretary, and Kent A. Hawley, chief engineer.

•

Municipal Power Law Upheld

Constitutionality of the state law to permit Iowa cities to build municipal light and power plants and pay for the construction out of future earnings has been upheld by the Iowa Supreme Court.

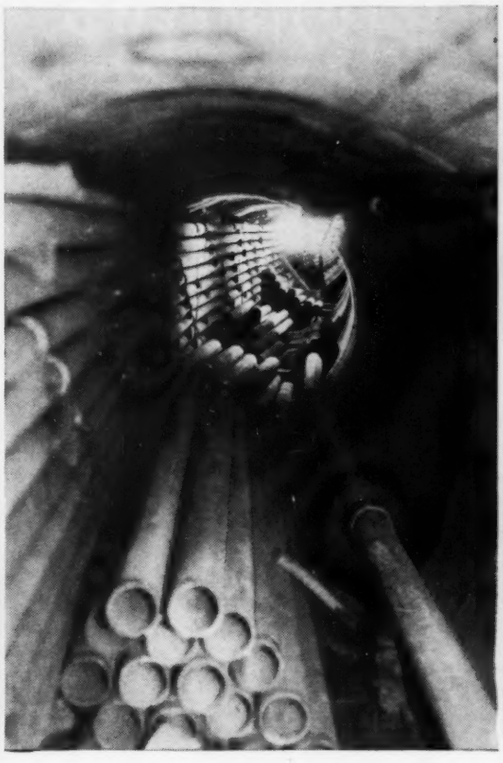
Strong . . . Permanent . . . Incombustible

It has great Adaptability!

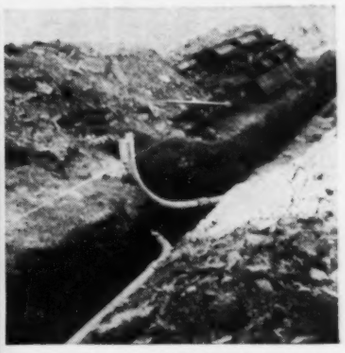
Johns-Manville
TRANSITE
CONDUIT

JOHNS-MANVILLE JM PRODUCTS

On Bridge Over R. R. Tracks



In Tunnel Under a River

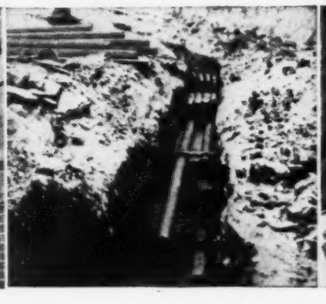


For Street Lighting System*

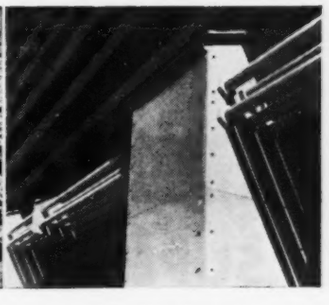
For Residential Distribution System*

For Fire Alarm System*

For Industrial Distribution



For Underground Transmission*



For Buss Bar Housings

OVERHEAD . . . underground . . . even under a river . . . The camera demonstrates the great adaptability of Transite Conduit.

An adaptability made possible by a group of characteristics unique in electrical conduit.

Transite Conduit is *strong*. Withstands soil stress, earth load, all ordinary street traffic. It is *permanent*. Highly resistant to soil corrosion, immune to electrolysis, absolutely weatherproof. And it is *incombustible*. Unharmed by smoke and corrosive fumes. Burn-outs generate no smoke, fumes or combustible gases.

Furthermore, Transite Conduit has a low coefficient of friction; cables pull without damage . . . it has a high rate of heat dissipation . . . and it is easily and economically installed.

May we furnish full details? Mail the coupon for the Transite Conduit brochure. Johns-Manville, 22 East 40th Street, New York City.

(Transite Conduit available only in the United States and Canada.)

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22 East 40th Street, New York City

Send me a copy of the new Transite Conduit brochure.

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Organization_____

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City_____ State_____

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***Note elimination of concrete envelope on these four underground jobs.**

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SUPERIOR

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Help You

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In Meter Installation

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SALES OPPORTUNITIES IN NEW CONSTRUCTION

BROOKLYN, N. Y. — Public Works Officer, Navy Yard, plans extensions and improvements in electrical lines and system. Cost $420,000, with equipment. Also will install motors and controls, electric hoists, conveyors and other equipment in proposed one-story structural shop at local yard, estimated to cost $630,000. Appropriations are being arranged. Proposed to ask bids soon.

CHICAGO, ILL. — Liquid Carbonic Company plans installation of motors and controls, conveyors and other equipment in new plant addition. Cost about $400,000.

YORK, S. C. — Duke Power Company, Charlotte, N. C., plans new transmission line from York to McConnelsville, S. C., and vicinity, about 10 miles, with distribution facilities at latter place.

PORTLAND, ORE.—United States Engineer Office will receive bids until June 18 for one 4,000-kw., a.c., generating unit with accessory equipment, for Bonneville, Ore., hydro-electric power project. (Circular 20.)

NEW ORLEANS, La. — Great Southern Wirebound Box Company, Southport, plans installation of motors and controls, electric hoists, conveyors and other equipment in new plant addition for fiber container manufacture. Diboll & Owen, Ltd., Canal Bank Building, is architect. Cost about $100,000.

EVANSTON, ILL.—Public Service Company of Northern Illinois, Chicago, plans new power substation and extension in transsion lines at Evanston. Sargent & Lundy, Inc., 20 North Wacker Drive, Chicago, is consulting engineer.

LARCHMONT, N. Y.—Is considering new city-owned electric light and power plant in conjunction with waterworks station. Estimated cost $530,000. Financing will be arranged through federal aid.

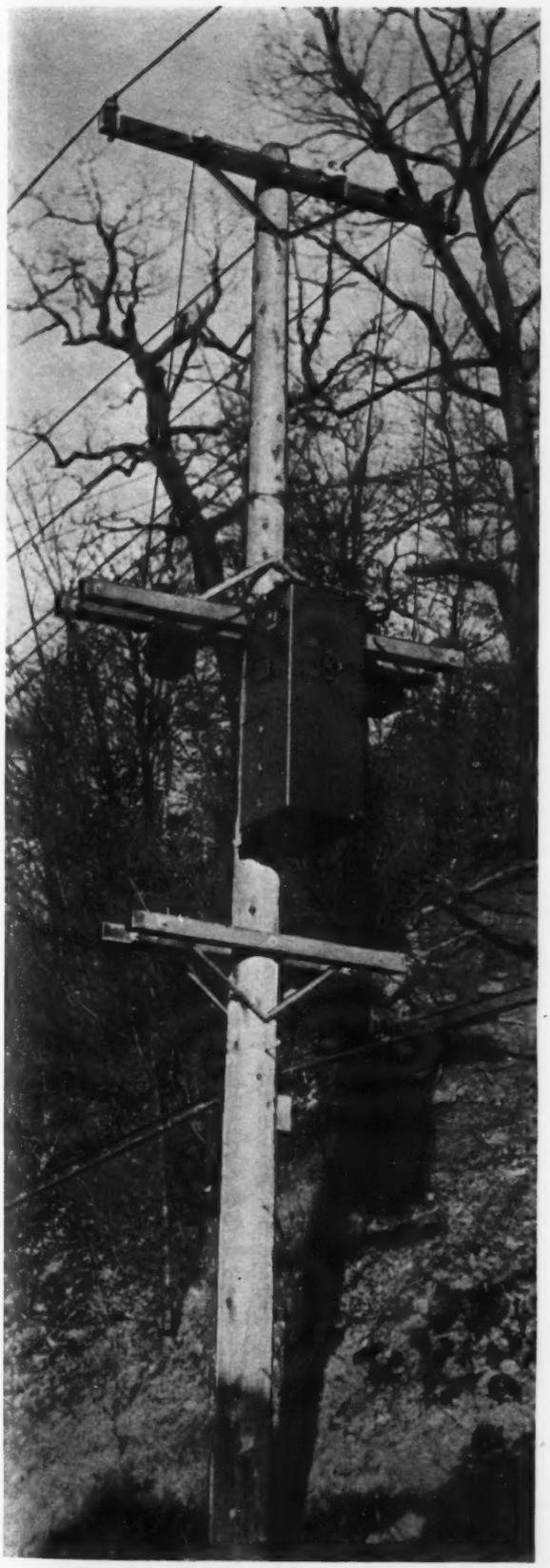
WINONA, MINN.—United States Engineer Office, St. Paul, Minn., asks bids until June 14 for power, control, lighting and auxiliary electrical work for Lock and Dam No. 5-A, Mississippi River, near Winona, including transformers and regulators, remote control switch cabinets, lock grounding system, dam conduit system, switchboards and instruments, power feeders and connections, gas-electric standby power unit, two electric tow-haulage units, central control station, lock lighting system, navigation lighting system, bridge lighting system, etc., and hand-operated traveling bridge crane.

BRANFORD, CONN. — Atlantic Wire Company plans installation of motors and controls, regulators, conveyors, etc., in four new one- and multi-story additions to plant. Cost over $150,000. Leo F. Caproni, 742 Elm Street, New Haven, Conn., is architect and engineer.

ZANESVILLE, OHIO — United States Engineer Office, Zanesville, will receive bids until June 14 for constructing 132-kv. transmission line for relocation of Philco-Canton power line of Ohio Power Company, near Bolivar, Ohio, in connection with Muskingum River watershed conservancy project. (Circular 105.)

NEW CASTLE, PA. — Has passed ordinance calling for special election to approve bonds for $1,500,000 fund to be used for proposed city-owned electric light and power plant.

NORFOLK, VA.—Public Works Officer, Navy Yard, is securing an appropriation of $420.000 for extensions and improvements in electric lines and system at local navy yard. Early call for bids planned. Motors



New...

Not a Compromise but a Real Regulator

for 2400 to 13,200 Volt Rural Lines at Low Cost

● The Allis-Chalmers Type AFR regulator opened up possibilities for regulating 6900 and higher voltage feeders and introduced new economies in regulating 2400 volt urban feeders.

● Now Allis-Chalmers pioneers the Type BFR regulator as a companion to the Type AFR and intended for branch feeders and long rural lines where economy in regulation is desired without sacrificing reasonably good regulation. The Type BFR regulator covers a range of 10% in 8-1¼% steps.

● Flexibility in application is provided so the unit can operate between 10% boost and 0% boost; 7½% boost and 2½% buck; 5% boost and 5% buck; 2½% boost and 7½% buck; 0% boost and 10% buck.

● It is responsive to voltage conditions. For its vital parts it employs tried and proven elements of the Type AFR regulator.

Standard Sizes are Available from

25 to 200 amperes, 2400 volts, single-phase or three-phase.
10 to 100 amperes, 6900 volts, single-phase or three-phase.
10 to 100 amperes, 7620 volts, single-phase.
5 to 50 amperes, 11,500 and 13,200 volts, three-phase.

● Ask the nearest Allis-Chalmers representative for detailed information covering this new development.

At left—100 ampere, 2400 volt, Single Phase Unit.

ALLIS-CHALMERS

Allis-Chalmers Manufacturing Company, Milwaukee

and controls, electric hoists, conveyors and other equipment will be installed in proposed additions to foundry, for which fund of $180,000, is being arranged.

JACKSON, TENN. — West Tennessee Power & Light Company plans extensions and improvements in power substation, with installation of transformers, distribution feeders, switchboard and accessories.

BEAUMONT, TEX.—Magnolia Petroleum Company, Dallas, Tex., plans installation of motors and controls, transformers and accessories, pumping machinery and other equipment for expansion and improvements in oil refining plant at Beaumont. Cost close to $1,000,000.

ST. JOSEPH, MO.—Armour & Company, Union Stock Yards, Chicago, Ill., meat packers, plan installation of motors and controls, hoists, conveyors and other equipment in new multi-story plant at South St. Joseph. Cost about $100,000.

WASHINGTON, D. C.—Bureau of Supplies and Accounts, Navy Department, will receive bids until June 14 for two electric generator sets, two switchboard panels and accessory equipment for Eastern and Western Navy Yards. (Schedule 5223.)

MEMPHIS, TENN. — Standard Brake Shoe & Foundry Company, Pine Bluff, Ark., plans installation of motors and controls, electric hoists, crane, conveyors and other equipment in new multi-unit plant on 1½-acre tract of land near Memphis, recently acquired. Cost about $150,000.

RAHWAY, N. J. — Merck & Company, Inc., plan installation of motors and controls, conveyors, etc., in new addition to chemical works, including remodeling of existing buildings for production. Cost about $200,000.

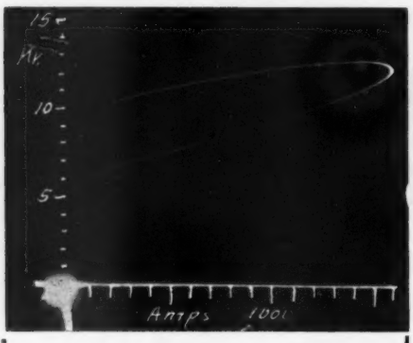
VALLEJO, CALIF. — Public Works Officer, Mare Island Navy Yard, plans extensions and improvements in electric system and lines at local yard, including installation of new distribution and other equipment. Appropriation of $120,000 is being authorized; also a fund of $216,000 for utility transportation buildings and facilities. Proposed to ask bids at early date.

GASTONIA, N. C. — Firestone Cotton Mills, Inc., Gastonia, a subsidiary of Firestone Tire & Rubber Company, Akron, Ohio, plan installation of distribution transformers and accessories, motors and controls, conveyors, etc., for expansion and improvements in local mills, recently acquired, to be equipped as largest cord fabric plant in the world. Cost over $400,000. Robert & Company, Bona Allen Building, Atlanta, Ga., are engineers.

CHARLESTON, S. C.—Public Works Officer, Navy Yard, plans extensions and improvements in electrical distribution system at local yard, with installation of new equipment. Appropriation of $120,000 is being secured. Also will install motors and controls, distribution transformers and accessories, hoists, conveyors and other equipment in new sheet metal shop to cost $360,000, one-story addition to structural shop to cost $97,000, and one-story addition to pipe shop to cost $63,000. Proposed to ask bids soon.

ALLENTOWN, PA.—Pennsylvania Power & Light Company contemplates extensions in transmission and distribution lines in rural districts in central part of state for electric light and power service, including power substations and other facilities.

DANVILLE, VA.—Has secured grant and loan of $2,750,000 from PWA for proposed city-owned hydro-electric generating plant on Dan River, about 60 miles from city, and will proceed with project at early date. Project will include transmission line to city, power substation and distribution system.



EVERY ARRESTER Matches this Curve

We "take a picture" of the volt-ampere characteristics of every block of each LV arrester on the fluorescent screen of a cathode ray oscillograph to assure positive protection to your apparatus. If the volt-ampere curve of the block does not closely match the picture shown above, the block is scrapped.

Notice that the crest voltage is far below the value necessary to adequately protect your transformers. Note, too, that the cutoff voltage is high enough so that abnormal maintained voltages cannot harm the arrester.

These and many other advantages are described in Catalog 38-000. Why not get a copy from Westinghouse, Room 2-N, East Pittsburgh, Pa.

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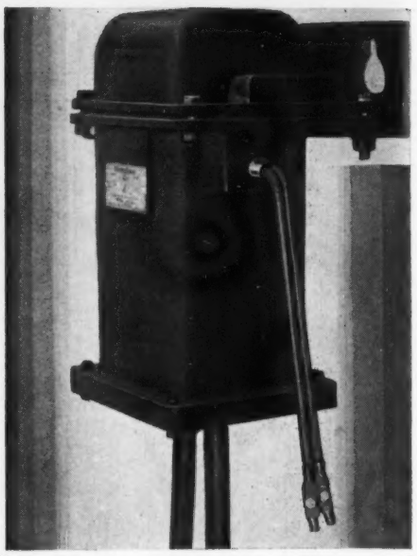
New LV ARRESTERS



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This transformer, designed for outdoor service, has a core of Hipernik, an exclusive Westinghouse product that has *three times* the permeability and only *one-half* the loss of the best silicon steel.

Other features are:

1 Will withstand surges and lightning disturbances.
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4 Secondary outlet for conduit connection.
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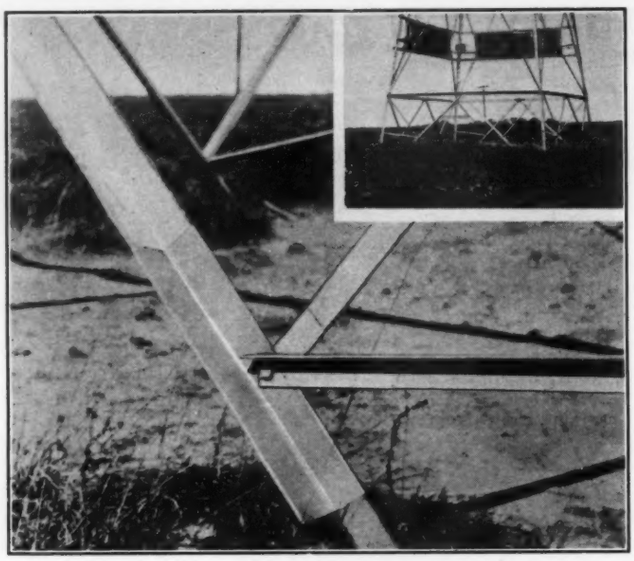

Field Test Proves Practicality of Painting Without Removing Rust

The above tower (in the Alliance-Canton Circuit of Ohio Public Service Co.) was spot coated with aluminum pigmented Rust-tox in August, 1932. The rust was rather heavy, but it was not removed.

This photograph, taken 26 months later, shows (1) no breaking through of the rust; (2) a perfect film of protection; and (3) high brilliancy of the aluminum powder.

Rust-tox is an approved vehicle for aluminum powder and paste. Samples and complete data will be sent upon request.

RUSTOX

THE SKYBRYTE COMPANY, Cleveland Ohio

West Coast Distributors: H. E. Townsend, 913 Carrillo Drive, Los Angeles
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1. What new device saves 25% to 40% of drafting time, and results in far greater accuracy?
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4. What simple process is used to make black-line prints directly from the tracing—without the use of a negative and *faster* than blue prints?
5. How you can make extensive alterations on part of a tracing without redrawing the entire tracing?

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White Tube Light Placed on Market

After thirty years of failure science has finally found a way to use carbon dioxide as an illuminant, and today Luminous Tube Lighting Corporation, Seattle, is putting a white tube light on the market. After David Roderick, electrical engineer of Seattle, who became interested in the project in 1929, succeeded in overcoming preliminary difficulties and a lamp was finally designed, A. W. Leonard, veteran of the electric light industry, formerly president of the Puget Sound Power & Light Company, and now president of the Luminous Tube Lighting Corporation, took the device East. It created a sensation. The result was that Dr. Thomas J. Killian, formerly research scientist of the General Electric Company, went to Seattle to serve as director of research in the new corporation. His work brought many refinements, and white light in tubes is now a commercial reality.

Dr. Killian maintains that this new illuminant practically duplicates white daylight as measured by a standard established of north sky light at 11 o'clock a.m. June 21, Cleveland, Ohio, the yardstick by which all "color temperatures" are measured. White light will be used primarily for industrial purposes, though many installations have already been made in department stores, in beauty parlors, artists' studios, etc. However, its freedom from eyestrain, its perfect visibility for reading purposes, may some day create a demand for white tube illumination for homes. Officers of the Luminous Tube Lighting Corporation are: A. W. Leonard, president; B. C. Beck, chairman of the board; David Roderick, vice-president and organizer; Osgood Packard, treasurer, and Stephen Chadwick, secretary.

•

Housing Projects Adopt General Electric Equipment

Meadowbrooke, Inc., one of the largest home-building organizations in Washington, D. C., has adopted General Electric equipment as standard for use in various building projects in the capital, and has placed an order for General Electric equipment, including 116 gas furnaces, 90 refrigerators and 50 ranges, estimated sufficient to cover all building operations for 1935.

•

Utility Reorganization Set

Reorganization of the Western Power, Light & Telephone Company, a $200,000,000 holding company with nine operating subsidiaries in Kansas, Oklahoma and Nebraska, under Section 77b of the federal bankruptcy law, has been approved by Federal Judge James H. Wilkerson.

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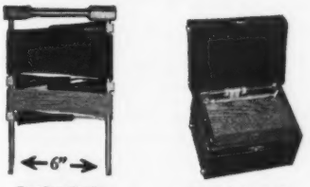

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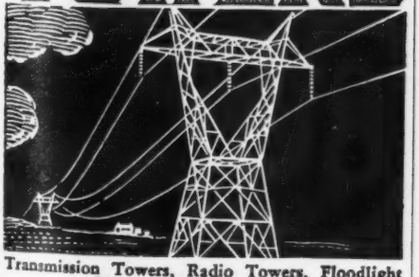
BORDEN ELECTRIC CO.
Summit New Jersey

TOWERS


Transmission Towers, Radio Towers, Floodlight Towers, Malone Anchors.
BLAW-KNOX COMPANY
Pittsburgh, Pa.
BLAW-KNOX

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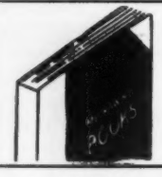

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